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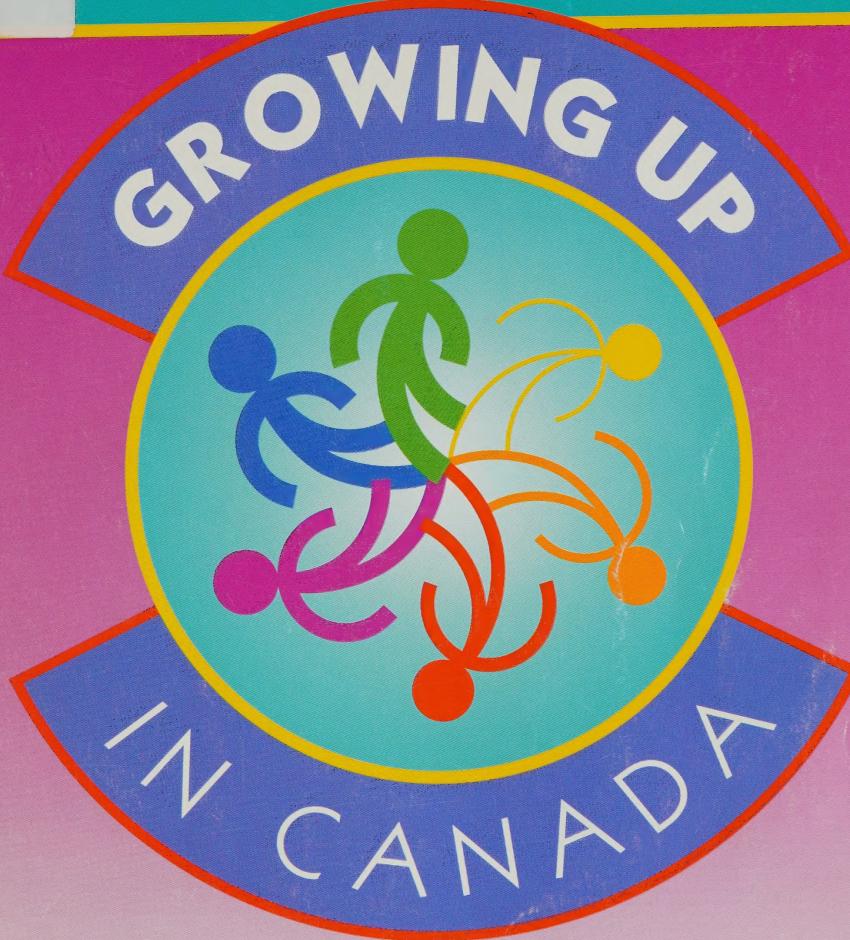
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National Longitudinal Survey of Children and Youth



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Growing Up in Canada

National Longitudinal Survey of Children and Youth

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Prologue

Giving all children the best possible start in life to ensure their well-being, healthy development and success in our changing society is an aspiration shared by us all. Parents, teachers, community volunteers, service providers and all levels of government in Canada work toward this goal every day.

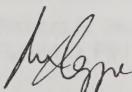
However there is much that we do not know about children in Canada, particularly how they are faring in this era of rapid change. The National Longitudinal Survey of Children and Youth (NLSCY), a joint undertaking by Human Resources Development Canada and Statistics Canada, is an important step in helping us learn more about how our children are developing today and what we can do to prepare them for the challenges of tomorrow.

The NLSCY is a long-term research program that will track a large sample of children over many years, enabling us to monitor children's well-being and development. It will also provide a better understanding of the factors that lead to their positive development, i.e., being well-adjusted, happy, successful in their chosen goals and capable of the continuous learning required in the future.

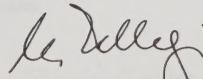
Many questions about Canada's children are still unanswered. For example, how many children are at risk of failing in school or in other parts of their lives, and why? What are the potential turning points in their lives? How do some children who seem to have the odds stacked against them go on to become fully participating, contributing adults? These are some of the questions the NLSCY can begin to answer.

This report contains several of the first analyses of NLSCY data. It presents the findings and conclusions of studies undertaken by several experts on child development. The studies illustrate the richness and diversity of the survey database, the analytic potential of which will grow enormously in years to come as further survey cycles are completed.

We hope that the NLSCY will become a valuable source of information you can use to help the children in your lives and your communities. We all have roles to play in the lives of our children and we hope that the survey research will enlighten and inspire us as we strive to fulfill them.



Mel Cappe
Deputy Minister
Human Resources Development Canada



Ivan P. Fellegi
Chief Statistician of Canada

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The National Longitudinal Survey of Children and Youth: An Essential Element for Building a Learning Society in Canada

Daniel P. Keating and J. Fraser Mustard

In an earlier paper,¹ we identified two dominant issues facing countries like Canada during this period of profound social and economic change: to build the new kind of economy that can create wealth from ideas; and, during a period of profound economic change with diminished resources, to sustain a healthy social environment that is best for human development. A key component of our ability to meet these two challenges is to ensure that our human resources — population health, coping, competence and well-being — are adequately supported.

There is now substantial evidence that the quality of early childhood experiences has long-term effects on individuals' performance in the education system, their behaviour in adult life and their risks for chronic diseases in adult life.^{1,2} We also know that the quality of the social environment in which individuals and families live and work has major effects on all stages of development. Thus, the influences on the development of competence and coping skills in early life — and how they relate to the capacity to learn and to health and well-being in later stages of life — have become an important subject. Longitudinal studies are needed for a better understanding of how events in early life affect health status and capacity to learn in adult life. Furthermore, a longitudinal data system is necessary to assess the value of early childhood interventions that are intended to reduce adverse outcomes in later stages of life. In the context of rapid social and technological change, the importance of this information is even greater.

Technological Change, Economic Growth and Society

Periods of major technological change can disrupt social cohesiveness and stability, which in turn have negative effects on child development and the population's health and well-being. We appear to be in a major technological revolution at present.

Today's major technological revolution may have as powerful an effect on societies' economic, political and social character as earlier ones did. The full effects of major technological change are hard to predict, but they do affect labour markets, job security and social stability. Some of the characteristics of this "chips-for-neurons revolution" appear to be^{3,4}:

- The replacement of low-level intellectual functions by electronic devices (such as bank machines, autonomous robotic devices, commercial aircraft's "automatic pilots," security devices, automation of services, automated and flexible manufacturing, global information systems, and so on). This is changing productivity, the nature of work, labour markets and job security.
- The capacity to make enormous bodies of knowledge instantly available to people linked through electronic networks, and the creation of learning networks which cross existing geopolitical boundaries. These are changing our approach to learning, to our education institutions and to labour retraining.

- The opportunity to interact through virtually instantaneous global networks in areas ranging from education and training to entertainment, financial markets and business and military activities.
- Virtually instantaneous transmission to people around the world through news media and other “information institutions,” whether objective or biased. This could change values, beliefs, cultures and concepts of work.
- The opportunity provided by information technology infrastructure for collaborative work and innovation through distributed activity. This is potentially capable of addressing complex scientific, economic and social problems.

Understanding and Meeting Social and Economic Challenges

During this period of rapid change, it is important to recognize the interdependence of economic and social development. Successful “new economies” will place a high premium on knowledge and innovation, which depend on a society’s human resources. Failure to invest in all stages of human development, particularly the early years, will negatively affect future economic prosperity in two ways. First, we may lack the human resources needed to sustain future economic growth. Second, we may increase the social burden arising from problems that begin early in an individual’s development and that then create multiple costs for the individual and for society over time. A good example is the developmental course of aggressive and anti-social behaviour, which is far easier to prevent early in development than it is to remedy after it has become an identified problem later on.⁵

Beyond the economic domain, we must be concerned with maintaining cohesive and stable societies in the face of rapid technological and demographic changes. This means that a civic society is not only an apparently essential component of economic prosperity, but it is also a necessary support for the intergenerational transmission of social capital.

This dynamic interplay between social and technoeconomic innovation over time is a key feature of human development.³ Maintaining high levels of coping, competence and health and well-being is essential for this interplay to be positive, rather than negative.

With our current understanding of the determinants of health, human development and economic growth, we can more successfully negotiate this transition now than in the past.

Early Development of Skills and Later Outcomes

As discussed above, one resource is an emerging conceptual framework that encompasses the full story of human development: individual biological and behavioural processes; the longitudinal consequences of how these processes operate in varying social environments; the population patterns arising from individual life courses; the effects on health and well-being; and the impact of changing social and economic structures on these population indicators and on societal functions.

There is emerging evidence that some societies are having difficulty coping with current socioeconomic change. It is important to monitor how such change affects children so that we can assess how well we, as a society, are coping with it. The effects of a poor childhood can be seen in children’s mental health problems and in the proportion of children starting school who cannot cope, some of whom become anti-social. A longitudinal study could help define which indices of human development are most likely to lead to long-term negative development.

Competence, Coping Skills and Health

How well people cope with challenges in their living and working environments appears to be an important influence on their vulnerability to many health problems ranging from cardiovascular disorders to suicide and accidents. An individual’s competence and coping skills are related to the development of the brain cortex during early childhood.⁶ We now have a better understanding of the brain and of the biological pathways that influence how diseases develop and are expressed in adult life. This new framework of understanding provides insights into the factors that cause income and social-class differences in health status. These differences show up as gradients in which individuals in lower socioeconomic groups show elevated levels of negative health outcomes.

Two lines of research are providing further insights into these biological pathways. The first comes from neuroscience research that is shedding light on how the billions of neurons in the brain

cortex differentiate and develop their specific functions in early life.⁶ This part of the brain and its close connections are key in sensing, cognitive capacity, behaviour, competence and coping skills. Therefore, its development in early life has a profound influence on how well we function in later life. The quality and quantity of the stimulation that undifferentiated neurons receive during such sensitive periods establishes many of their basic characteristics in later stages in life. These neurons undergo most of their basic differentiation as the brain develops during the late stages *in utero* and during the early years of life. It appears to be difficult in later life to overcome neural function defects that result from poor stimulation in early life. Table 1 summarizes these key findings from research in the neurosciences. The quality of the social environments in which children are brought up — especially through interaction with peers and adults — is a major influence on the quality of stimulation in early life and, therefore, on competence and coping skills in later life.

The second line of evidence comes from our better understanding of how an individual's response to challenges affects the body's biological pathways. Challenges have a major effect on the body's endocrine pathways. One example is the "fight or flight" syndrome.⁷ The hormones — particularly steroids — released when responding to a challenge affect other body systems, generally suppressing their function. Among the systems suppressed is the immune system, which is part of the body's defence system. Animals that do not cope well with challenges do not quickly restore their hormone levels to the resting state. A poor response to challenges can lead to more persistently elevated steroid levels, which depresses the host defence system and other body functions; this increases vulnerability to negative health outcomes. Recent observations have created a better understanding of the mind-body

relationship and of how the development of competence and coping skills in early life can influence a wide variety of causes of death in adult life, including suicides, accidents, some cancers and cardiovascular disease.

Competence, Coping Skills and the Learning Society

As our knowledge has improved about brain-cortex development in early life, so has our understanding of the relationship of early childhood experience to learning in school and in adult life. As with health outcomes, cognition and behavioural characteristics are also influenced by events during childhood. The socioeconomic gradients for a population's learning and cognitive capacity are similar to health gradients. These gradients are shallow in some countries and steep in others. For example, when assessed against the father's job classification (a crude measure of socioeconomic status) in international science and mathematics tests,⁴ a very shallow social gradient was revealed in the educational performance of Japanese students and a very steep gradient in that of American students.

In light of the increasing evidence about the important effects of early childhood on an individual's competence, coping skills, and health and well-being as an adult, it is important to examine what, if anything, can be done to reduce the risks of poor early development in inadequate social and family environments. The intense debates about genetic versus social factors and about the need for day care and early kindergarten attest to the ideological battle over this subject. The evidence about the impact of social environments comes from two lines of investigation into early life conditions and events in later life.

The first body of evidence comes from studies of animals ranging from rats to non-human

Table 1. Neuroscience and children

- Brain development before age 1 is more rapid and extensive than previously realized.
- Brain development is more vulnerable to environmental influences than suspected.
- The effects of early environment are long lasting.
- The environment affects the number of brain cells and the way they are "wired."
- We now have evidence of the negative impact of early stress on brain development and function.

Source: Mustard, F. 1996. "Technology, information and the evolution of social policy: the chips for neurons revolution and socio-economic change." In *Policy Frameworks for a Knowledge Economy*. Edited by T. J. Courchene. Bell Canada Papers on Economic and Public Policy. Kingston: John Deutsch Institute for the Study of Economic Policy.

primates. These studies can investigate a complete life cycle, which is not possible with human subjects. There is robust evidence from animal studies that conditions in early life have a profound effect on the development of the brain cortex and its function in later life. In rhesus macaque monkeys, it has been found that when poorly nurtured, members of the genetically vulnerable group experience poor outcomes in their subsequent development and adult coping skills. When challenged, they secrete a large quantity of stress-related hormones and the hormones do not quickly return to resting levels. However, members of the genetically vulnerable group that are well nurtured when young do well and often become leaders. When challenged, these animals have the same extensive physical stress response as the poorly nurtured group, but the hormones quickly return to resting levels. While genetics is important, nurturing or social influences in early childhood appear to be even more important in the development of competence and coping skills and in susceptibility to events later in life.⁸⁻¹¹

Because of the difficulties in studying our own species, the evidence from human studies is incomplete and less substantial than that from primate studies. A small but important study is the High Scope Study, which illustrates the long-term effects of early childhood events.^{12,13} Children aged 3 to 6 years who were living in poor social environments were randomly put into either an intervention group or a non-intervention group. Groups of five to six members of the intervention group were given substitute parenting or teaching five days a week. The preschool intervention ceased at age 6. Children in the intervention group showed no significant improvement in IQ compared with those in the non-intervention group. However, in later life the intervention group members recorded a much higher retention rate in the school system, 40% fewer teenage pregnancies, more stable marriages, better employment records, and less crime and drug use. The groups were re-examined when members reached their late twenties. Again, the performance of intervention group members was substantially better than that of non-intervention group members. An important aspect of this assessment was that members of the intervention group experienced substantially fewer mental health problems. It is increasingly recognized that many mental health problems in early life are the result of adverse circumstances in early childhood. It has been calculated from the High Scope Study that for every dollar invested in interventions with the 3- to 6-year-olds, the return was at least seven

dollars. Findings from this study, which are consistent with those from animal studies, illustrate both the long reach of the quality of development in early childhood into adult life and the value of social support networks for young children to prevent problems in later life.

Based on the emerging knowledge about brain cortex development, we suspect that the High Scope Study results would have been better had the intervention started earlier. There are some observations about interventions in the first two years of life and the effects on development by age 2.¹⁴ A group of high-risk Jamaican newborns were randomly allocated into four groups — no intervention, nourishment, stimulation, and stimulation plus nourishment — and followed until age 2. The group given both stimulation and nourishment reached the same development level as the control group of normal children by age 2. The groups given either stimulation or nourishment achieved 50% of the development of the control group by age 2. Although studies are in progress, unfortunately there are currently none on how such early interventions with at-risk children affect later stages of development and health risks in adult life.

There are also observational studies whose results are congruent with those from the intervention studies. Werner's observation of a group of children born on the island of Kauai in the 1950s¹⁵ has shown that young children in poor socio-economic environments who were able to interact with substitute parents or grandparents did much better in later life than those without this adult support. As with rhesus macaque monkeys, this study shows that adult support for a child does not have to come from a biological parent.

The NLSCY in the Learning Society

Along with the new framework of understanding, we also need reliable information about how the population is doing as we traverse this new territory. The National Longitudinal Survey of Children and Youth (NLSCY) is an important new venture that can help fill a crucial information gap that undermines our current ability to respond effectively to the challenges identified above.

It is important to understand the nature and importance of the information gap the NLSCY is designed to fill. During this period of rapid change, we must engage in continuous learning about how to respond in ways that support the development

of human resources. Some of the key elements for building a learning society have been noted in an earlier paper³: the key role of early development in support of human resources; the importance of monitoring and understanding human development at the population level; and the link between population-level information and action by communities. If its promise is fully developed, the NLSCY can provide essential support to each of these key elements for building a learning society.

Critical Periods in Early Development

Because families with young children are particularly vulnerable in periods of rapid social and economic change, we must factor in these critical or sensitive periods in early life. To the extent that social, economic and demographic changes increase developmental risk factors, particularly in early childhood, the long-term consequences for a population's human resources may be severe and very expensive in both human and economic terms.

The NLSCY can provide important new information in at least two ways. The first is to provide a clear and reasonably complete "snapshot" at the population level of how well children are doing in their early years and of the family and community resources that nurture them during those crucial early developments. The empirical research papers in this publication, based on Cycle 1 data from the NLSCY, offer an important initial insight into the value of the NLSCY database.

The NLSCY's second and even more valuable contribution will emerge over time as we track the consequences of these early developments in future cycles. It would be difficult to overstate the amount and importance of the information that will emerge from these follow-up studies. Despite our much improved understanding of the fundamental developmental processes in early life, at present we cannot estimate these impacts at the population level with any precision. Even more important, without ongoing monitoring of these patterns, we cannot determine if we are responding well or poorly to the escalating challenges of rapid social and economic change.

Population Monitoring of Human Development

A society needs usable information about how its population is faring and where problems are occurring. This monitoring must occur at the national, provincial and community levels because

important patterns emerge at each. The key to an effective system is a national framework, which is what the NLSCY can provide. We need a range of important comparisons so we can learn from our collective experience: for any given indicator, are we doing better or worse than last year or five years ago? Are some regions or communities handling challenges better than others? Where are the most significant problems emerging for children and youth? What are the longer-term consequences of those problems on their subsequent health and competence? All these questions require population-level estimates, as well as the ability to follow developmental pathways within individuals. The NLSCY's unique potential is that it can address this combined requirement for the effective monitoring of the development of human resources.

To capitalize on this knowledge, an adaptive society must build networks among these multiple monitoring activities. Over time, it will be important to use the NLSCY as a tool to link provincial, regional and community indicators of children and youth's healthy development. In this way, we can construct the kind of information system communities will need to assess how well they are doing. It is instructive to note the vast amount of attention paid to financial and economic indicators and how they change over time; such information plays an important role in societal decision-making. To engage in societal decision-making without equally reliable population-level indicators of human resources will become an increasingly risky proposition, particularly since the quality of a population has a major effect on economic growth.

Along with such monitoring, we need ongoing research that can model both the population-level indicators of outcomes and their underlying developmental processes and pathways. We know, for example, that the steepness of social-class gradients is an important indicator of population health;⁷ similar patterns seem to emerge for population competence as measured by school performance. It is noteworthy that the gradients show that these issues apply equally to the middle class and are not solely an issue of the poor.

To understand the influences that create these social-class gradients — so we can identify both their origins and the points of leverage to make changes in the system — we must consider potential underlying factors. One of the NLSCY's particular strengths is that it incorporates a substantial number of developmental indicators,

including family composition, employment and economic well-being, parenting and community resources. With this inclusion of multiple variables and the longitudinal tracking of individuals, in future we will be able to identify causal patterns that may be suited to effective prevention and intervention activities at the individual, family and community levels. Several of the research papers in this initial publication, which are based on NLSCY Cycle 1 data, suggest the value of this approach; they also highlight the survey's great potential as it enters its longitudinal phase in subsequent cycles.

Support for Community Action and Community Linkages

Communities must be involved in generating local solutions to identified challenges. There are several reasons for this: the problems differ in different communities; local solutions engage a wider variety of the population, which is itself a sign of a civic society; and financial resources will have to come from a variety of sources, not just government.

Community initiatives must be able to build on each other, rather than requiring reinvention on each occasion in each community. Governments can play a key role in this by reserving public spaces on the "information highway" to allow intra- and inter-community exchange. As occurs in the corporate sector, we must apply the notions of continuous improvement and sharing best practices.

The basis of such community learning is reliable information against which to judge a solution's efficacy, both over time and among different communities. The NLSCY provides a framework for this type of activity.

Can Societies Learn to Adapt?

It is essential to establish the mechanisms to monitor important human development outcomes and to incorporate this knowledge into both public and private planning and policy decisions. No modern government or business would finalize decisions without economic information, and most new initiatives that would change the physical world require an environmental impact assessment. However, the necessary monitoring mechanisms have not been in place for human development indicators in the past. The NLSCY's signal potential is its capacity to fill much of this gap and to serve as both a springboard and a magnet for other

initiatives that together can form the information system we need.

We are not starting from nothing as we try to build this information network. Elements of such a network already exist, and modest resources can capitalize on them through better and continuing coordination. It is fundamental that a learning society design the best possible technical and social supports to help create and sustain the opportunities for such community and societal knowledge-building.

It is clear that many features of the social environment must be enhanced to support optimal developmental outcomes for both preschool and school-age children. Given the current rapid pace of social change, it would be foolhardy to assume that negative trends in developmental outcomes can be turned around without conscious effort. The social and economic stresses on many families, particularly those with young children, negatively affect these families' capacity to support core developmental needs. To build a learning society, we must first know how well we are doing and whether or not our efforts at improvement are succeeding. The NLSCY offers considerable promise in making this first step a reality.

References

1. Keating, D. P., and J. F. Mustard. 1993. "Social economic factors and human development." In *Family Security in Insecure Times*. Vol. 1. Edited by D. Ross. Ottawa: National Forum on Family Security.
2. Frank, J. F., and J. F. Mustard. 1994. "The determinants of health from a historical perspective." *Daedalus*, 123: 1-19.
3. Keating, D. P. 1995. "The learning society in the information age." In *Changing Maps: Governing in a World of Rapid Change*. Edited by S. A. Rosell. Ottawa: Carleton University Press.
4. Mustard, F. 1996. "Technology, information and the evolution of social policy: the chips for neurons revolution and socio-economic change." In *Policy Frameworks for a Knowledge Economy*. Edited by T. J. Courchene. Bell Canada Papers on Economic and Public Policy. Kingston: John Deutsch Institute for the Study of Economic Policy.

5. Tremblay, R. E., and W. M. Craig. 1995. "Developmental crime prevention." In *Building a Safer Society: Strategic Approaches to Crime Prevention*. Edited by M. Tonry and D. P. Farrington. Chicago: University of Chicago Press.
6. Cynader, M. 1994. "Mechanisms of brain development and their role in health and well-being." *Daedalus*, 123: 155–165.
7. Evans, R. G., M. Hodge and I. B. Pless. 1994. "If not genetics, then what? Biological pathways and population health." In *Why Are Some People Healthy and Others Not?* Edited by R. G. Evans, M. L. Barer and T. R. Marmor. Hawthorne (NY): de Gruyter.
8. Coe, C. L. 1993. "Psychosocial factors and immunity in nonhuman primates: a review." *Psychosomatic Medicine*, 55: 298–308.
9. Kolb, B. 1989. "Brain development, plasticity, and behavior." *American Psychologist*, 44: 1203–1212.
10. Sapolsky, R. 1992. *Stress, the Aging Brain, and the Mechanisms of Neuron Death*. Cambridge (MASS): MIT Press.
11. Suomi, S. 1991. "Early stress and adult emotional reactivity in rhesus monkeys." In *The Childhood Environment and Adult Disease*. CIBA Foundation Symposium. Chichester: Wiley.
12. Weikart, D. P., J. R. Berrueta-Clement, L. Schweinhart, W. S. Barnett and A. S. Epstein. 1984. *Changed Lives: The Effects of the Perry Preschool Program on Youths Through Age 19*. Ypsilanti (MI): High Scope Press.
13. Weikart, D. P., L. Schweinhart and H. V. Barnes. 1993. *Significant Benefits: The High Scope Perry Preschool Study Through Age 27*. Ypsilanti (MI): High Scope Press.
14. Grantham-McGregor, S. M., C. A. Powell, S. P. Walker and J. H. Himes. 1991. "Nutritional supplementation, psychosocial stimulation and mental development of stunted children: the Jamaican study." *Lancet*, 338: 1–5.
15. Werner, E. E., and R. S. Smith. 1992. *Overcoming the Odds: High-risk Children from Birth to Adulthood*. Ithaca (NY): Cornell University Press.

Overview: Children in Canada in the 1990s

David P. Ross, Katherine Scott and Mark A. Kelly

1. Introduction

Notwithstanding the importance of genetic make-up, the well-being of children depends heavily upon the environments in which they live. Healthy children emerge most often from healthy families, and healthy families are in turn promoted by healthy communities. Yet while there is broad agreement that what children experience in their environment is important, there is much we don't know about the specifics or pathways of how environment affects child development: how family income and parenting styles, for instance, affect a child's school readiness and academic achievement; or how the type of child care or the security of the neighbourhood affects peer relationships or physical development.

The child development process can be likened to a "black box." We see children and their environments go into the box, and we see them come out transformed. We know that interactions take place within, but we can't see inside to directly observe how they take place. The difficulty of seeing inside the box is primarily a reflection of the enormous variability and complexity of the child development process. With so many influences on child development and so many different children, it is hard to isolate the impact of any one factor or influence.

If child development were a physical science (which it certainly is not), it would be possible to perform laboratory experiments under strictly controlled conditions — we could see directly into the "black box". We can study what makes healthy plants by selecting different seeds, planting them in different soils, then altering the blend of nutrients, the amount of water and sunshine, the purity of the air and so on. We can then measure growth each

day. If children were plants we could do the same. We would alter the style of parenting, the type of child care, the family's income, the safety of their neighbourhoods, the number of their friends and so on. Then we would measure their development weekly and be in a pretty good position to know how different factors affect child development. Since we have no such laboratories, the best substitute is to have comprehensive ("holistic") studies that track a child's development from conception through adulthood. These are known as *longitudinal* surveys and studies.

To date in Canada we have not had such a holistic survey. We have a few regional and local studies that attempt to track the influence of one or a few factors on certain child outcomes. But until now we have not had a national study that looked at virtually the totality of a child's environment to determine how it influences a wide variety of outcomes broad enough to encompass what is normally considered "child development."

The National Longitudinal Survey of Children and Youth (NLSCY) now dramatically changes this situation for the better. This ambitious study, launched by the federal government, takes us a giant step further in our ability to understand child development. The NLSCY provides a unique opportunity to study the progress of children from infancy to adulthood. The results of this survey, once it has been operational for several years, hold great promise for sorting out the processes at work in the "black box" of child development.

The importance of this work goes beyond a narrow academic application. The life chances of children are increasingly compromised by, for example, growing up in ever-changing family structures and by their families being exposed to

greater levels of economic insecurity. As a result, a better understanding of child development is critical to devising strategies that target the children and families most in need and will help create a healthier environment for all children.

The NLSCY follows a representative sample of children from across Canada. Not only is basic information being collected that allows an exceptionally detailed portrait of who these children are and where they live (as the research papers in this volume demonstrate); in many cases it also provides first-time information on what are widely agreed to be the significant environmental factors shaping child development. As well, the survey presents data on outcomes — that is, on factors that allow us to track the progress of children in Canada — such as their physical, behavioural, social, learning and emotional well-being.¹ Over time, this range of information will allow us to better understand what goes on inside the “black box” by linking the environmental inputs to the child progress outcomes.

This research paper provides an overview of the first release of NLSCY data. However, it contains data representing only one point in time — 1994–1995* — and therefore it is only a “snapshot.” The data being released in this volume are baseline data, and they give a rich picture of the stage of child development and the environment in 1994–1995. This information, while highly useful, falls short of the longitudinal “video” we need to determine how certain environmental factors influence child outcomes over time. We can use the snapshot data to examine which current environmental factors are associated with certain child and family characteristics and behaviours. But until we have the results of future cycles of the survey, we will not know how these current environmental factors will shape children as they grow up.

Consequently, the full potential of the NLSCY will only be realized as future cycles of the survey are completed. At that point, we will have a better understanding of the biological, cognitive and socioeconomic processes involved in healthy child development. We will gain greater insight into the childhood risk factors that increase the likelihood of poor developmental outcomes for children and youth, as well as the protective or preventive factors

— individual, family and/or community — that result in positive outcomes such as school completion.

In total, information was collected on 22,831 children from birth to 11 years of age. The sample included children who had been living in institutions for over six months (e.g., hospital, residential child-welfare facility) and Aboriginal children living on-reserve. Some Aboriginal children living off-reserve in the provinces were captured in the sample. Although information was collected in the Yukon and Northwest Territories, it is not included in this first data release.

In each of the survey households, Statistics Canada interviewed the “person most knowledgeable” (PMK) about the child to solicit information about children aged 0 to 11 years and their families. The oldest children in the survey, 10- and 11-year-olds, were also asked to complete a questionnaire about their experiences and opinions. In addition, teachers and principals were part of the survey. The PMK, with rare exceptions — only 0.5% of cases — was a parent (including biological, adoptive, step- and foster mothers and fathers).[†]

The complete findings of the first cycle of data collection are being made available in two waves. This collection of research papers is based on the findings of the first wave. The information being released includes data on topics such as child temperament, behaviour and school readiness, as well as basic sociodemographic data on children and their families and a number of indicators that measure how well families are functioning. Second-wave findings will be released at a later date.[‡]

In subsequent cycles, the NLSCY will begin to provide information on how children are progressing through childhood and their teen years. The same panel of children will be interviewed every two years

[†] For the purposes of this research paper, we are substituting the term ‘parent’ for ‘PMK’ in order to use a familiar term more easily understood. Moreover, as parents were in fact the person most knowledgeable (the respondent) for 99.5% of all the children surveyed, negligible distortion is done to the survey statistics. Of the parents, mothers made up the majority of respondents, completing the PMK questionnaire for 89.9% of the children in the survey; fathers completed the survey for 9.5% of children. The PMK was neither the mother or father in only 0.5% of the cases.

[‡] The second wave of the first NLSCY release will cover topics such as child health, literacy, activities, and the family and custody history of the children surveyed. In addition, results of the teacher’s and principal’s questionnaire will be published, along with other information about the children’s neighbourhoods. Complete results from the questionnaire completed by 10- and 11-year-olds will be available at this time.

* The data for the first cycle of the NLSCY were collected between 1994 and spring 1995.

until they reach adulthood. New infants will be added to the survey sample in the second and subsequent cycles to allow for ongoing cross-sectional analysis to supplement the primary longitudinal research.

This overview is organized into three sections. The first part presents a profile of children in Canada in 1994–1995: who they were, where they lived and how they were faring. The next part turns to the status of families in Canada and the dynamics of family life. Both sections present cross-sectional data, that is, snapshot observations.

In the conclusion, we begin to explore the potential of the NLSCY by linking selected environmental variables such as household income to child outcomes such as motor and social development. While these cross-tabulations do not establish a causal relationship between one factor and another, they are suggestive of what might be the most productive lines of research to pursue in the effort to better understand the complexities of child development. Some of these lines of research are explored in greater detail in the research papers that follow this overview.

2. A Portrait of Children in Canada, 1994–1995

Children in Canada: Who are they?

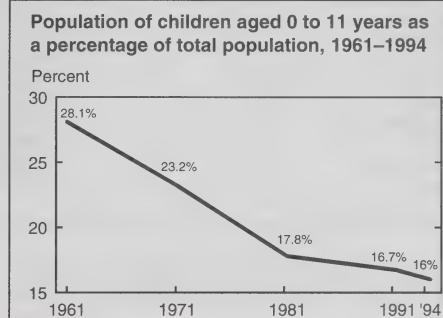
There is tremendous diversity among children in Canada. They come from varied ethnic, religious and linguistic backgrounds; they live in many different types of families and households; and they are growing up in families with disparate levels of social and economic resources. At the end of the twentieth century, the lives of children in Canada have never been more complex, the life chances of many of them never more uncertain.

Number of Children

In 1994–1995, there were 4.67 million children aged 0 (newborn) to 11 years in Canada — 51.1% boys and 48.9% girls. Children in this age group made up 16% of the population of Canada. Since the height of the baby boom, now 35 years ago, the fertility rate has dropped steadily from 3.9 children per woman in 1960 to a low of 1.6 in 1987. The total fertility rate crept up to 1.7 in 1992 as the largest group of baby boomers reached their peak

childbearing years. However, the expected baby boom "echo" did not really materialize as expected.² Figure 2.1 illustrates the steady decline of the child population in Canada over time.^{3,4}

Figure 2.1



Source: Dominion Bureau of Statistics, *Census of Canada 1961, Population*; Statistics Canada, *Census of Canada 1971, Population, General Characteristics*; Statistics Canada, 1981 *Census of Canada, Population, Age, Sex and Marital Status*; Statistics Canada, *Census of Canada 1991, Age, Sex and Marital Status*; Statistics Canada, *Annual Demographic Statistics*, 1994.

The percentage of the population composed of children varied by province, ranging from a low of 15.1% in Quebec to a high of 18.1% in Alberta, as Table 2.1 shows. The lower birth rate in Quebec goes some way toward explaining provincial policies aimed at encouraging large families. Since 1987, Quebec has taken steps to encourage families to have more children, providing financial incentives and other supports. There has been an increase in the total number of births in Quebec; the fertility rate increased from 1.4 in 1987 to 1.65 in 1992. However, the Quebec rate was still lower than the Canadian average.²

Living in Cities

Today, most children in Canada live in urban centres. The NLSCY reveals that 82.1% of children aged 0 to 11 years lived in urban centres, and almost half of these lived in cities of 500,000 residents or more. Only 17.9% lived in rural areas. The trend toward urban living is well established around the world as societies have moved from agriculture-based economies to industry-based economies over the course of the twentieth century. Families have migrated to the cities to pursue

Table 2.1. Distribution of children aged 0 to 11 years by province, 1994

Province	Children (0 to 11 years)	Total population	Percentage of the population
Newfoundland	89,500	581,800	15.4
Prince Edward Island	23,200	132,400	17.5
Nova Scotia	144,700	928,100	15.6
New Brunswick	115,900	754,400	15.4
Québec	1,099,000	7,280,200	15.1
Ontario	1,777,500	10,940,000	16.2
Manitoba	183,300	1,122,400	16.3
Saskatchewan	176,400	1,003,300	17.6
Alberta	489,600	2,709,500	18.1
British Columbia	574,200	3,627,400	15.8
Canada	4,673,400	29,176,600	16.0

Source: NLSCY (for number of children aged 0 to 11 years), and Statistics Canada, Annual Demographic Statistics, 1994 (for total population by province).

economic opportunities. As a result, fewer children live on farms or in small rural communities.

In Canada, the percentage of the population living in urban areas has increased slowly since the early 1960s, from 70% in 1961 to 77% in 1991. This increase may appear modest, but there are notable regional variations. The number of people living in rural areas is much higher in the Maritime provinces. In 1991, 60% of the residents of Prince Edward Island were living in rural areas, 52% in New Brunswick, and 46% in Nova Scotia and Newfoundland. In Newfoundland, the number actually increased since 1981, from 41% to 46%. The two other provinces that had rural populations above the national average (23%) in 1991 were Saskatchewan and Manitoba, at 37% and 28%, respectively. Only a small number (3%) of the individuals and families who lived in rural areas actually lived on farms.³

The romantic vision of small, tightly knit communities is no longer the Canadian reality. Most children grow up in large urban centres. Living in cities has many advantages, including greater cultural diversity and a greater range of social and health services. Of equal importance, most economic activity and job creation is now concentrated in urban centres. But city living is also associated with smaller families, higher divorce rates, social and economic mobility, and a diminished sense of community. City living today offers children and families at least as many challenges as it does opportunities.

Ethnic and Racial Diversity

Most children in Canada born in the 1990s will grow up in ethnically and racially diverse urban centres. Twenty-five years ago, the majority of Canadians were of British or French ancestry. Germans,

Italians and Ukrainians were the next largest ethnic groups.⁴ The cultural landscape has changed in recent years; while Canadians of British and French ancestry still predominate, Canada is now home to many more peoples from around the world.

Table 2.2 details the ethnic and racial diversity of children in Canada aged from 0 to 11 years. These data include children whose parents reported only one country or region of ethnic origin on their behalf and those who reported more than one ethnic origin (which is why the table adds up to more than 100%).

The NLSCY reveals that 51.9% of respondents reported Canadian ancestry. The next largest group reported Britain, Scotland and Ireland as at least one of their ancestral countries, followed by those who claimed French and then European ancestry. Another 3.2% of respondents reported ancestors from China and South Asia, and 1.4% reported Black or African roots.

An Aboriginal origin was reported by 4.3% of respondents. Because the NLSCY did not survey Aboriginal children and families living on reserves and because children in the Yukon and Northwest Territories are not included in this data release, this estimate is based on Aboriginal children and families, including Registered and non-Registered Indians, Métis and Inuit, living off-reserve in the ten provinces.

The percentage of Aboriginal children stands out because children make up a much larger proportion of Aboriginal communities than they do of non-Aboriginal communities. In particular, both the Inuit communities and Registered Indians living on-reserve have large numbers of young people.

Table 2.2. Ethnic origins of children aged 0 to 11 years, 1994–1995

Ethnic origins	Respondents reporting each ethnic origin ^a (%)
Canadian	51.9
British ^b	35.3
French	27.4
European ^c	25.1
North American Indian, Métis or Inuit	4.3
Chinese or South Asian	3.2
Black or African	1.4
Other	18.1

Note: The ethnic origins of the child are based on the response given by the PMK.

^a Total will add to more than 100% because some respondents reported more than one ethnic origin.

^b Includes English, Scottish and Irish.

^c Includes Dutch, German, Italian, Jewish, Polish, Portuguese and Ukrainian.

Source: NLSCY

In both 1986 and 1991, nearly 40% of the inhabitants of these communities were under 15 years of age; six out of ten were under the age of 25.⁵

Language

Canada's cultural diversity has led to an increasing linguistic diversity in its children. In 1994–1995, 68.6% of children reported English as their first language (the language that a child learns at home and still understands). French was the first language of 22.2% of children, the majority of whom lived in Quebec. The remainder reported either a combination of English and French (less than 1%) or another language (7%). Among other languages, Chinese, Polish and Spanish were the most common.

Some children in Canada are now multilingual. Figure 2.2 shows that 15.1% of children in Canada were fluent in two languages and another 1.2% spoke three or more. Of those who spoke two languages, half spoke English and French, and half spoke English or French and one other language.

Children in Canada: How Are They Faring?

These are the facts about children in Canada in 1994–1995: they made up a smaller segment of Canadian society than they did 35 years earlier, they lived largely in urban environments, and they came from an impressive variety of ethnic and racial backgrounds and spoke many different languages. These data tell us who the children are. The more important question is how they are doing, and the NLSCY reveals some of the answers. For the first

time, a national sample of children and families was surveyed on their social, physical and economic well-being.

On the whole, we found that children in Canada were physically, emotionally and socially healthy. But averages almost always conceal disparities, and in the survey results we see that a number of children were experiencing difficulties. If neglected, these difficulties or less positive outcomes may lead to ill health, inferior school performance, unsatisfactory social relationships and ultimately poor labour-market opportunities down the road.

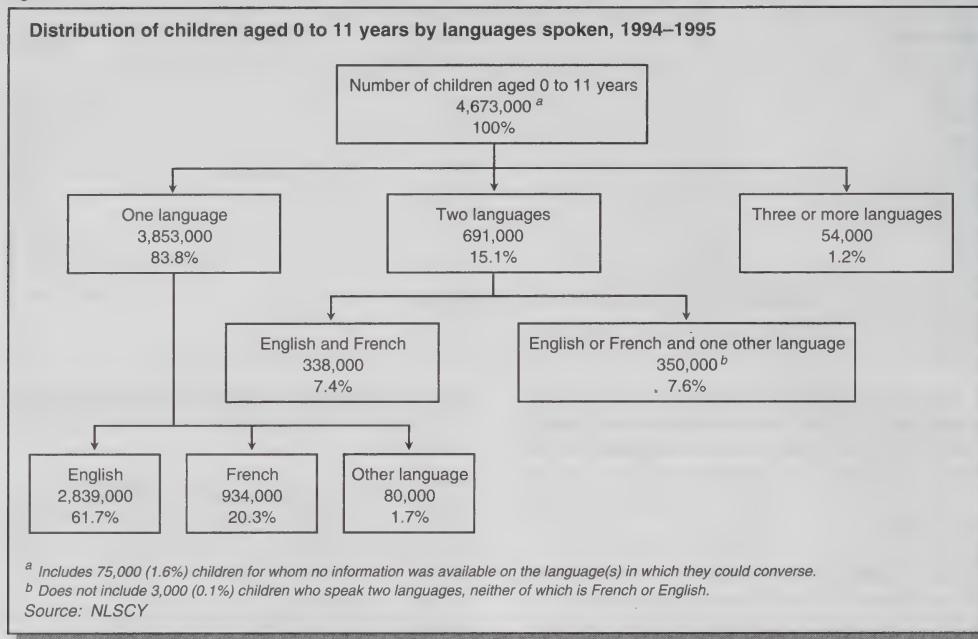
Health Status of Newborns

A good start in life is critical to people's health and well-being over their lifetime. Repeated studies have demonstrated the serious consequences of poor health at birth. There is a well-established link between important indicators of health at birth — such as low birth weight and prematurity — and health and social problems later in life.

Roughly 9.7% of children in the NLSCY sample were born prematurely (the survey considers a normal pregnancy to end between 259 and 293 days; those born before 259 days are called premature).^{*} The number of low birth weight babies was lower than the rate of prematurity: 5.7% of the infants aged 0 to 3 years surveyed had a low birth weight compared with 9.7% who were born prematurely. This figure is consistent with previous reports of the incidence of low birth weight, which has hovered around 6% for the last 20 years.

* Data on the health of newborns, including low birth weight and prematurity, were derived from the responses of biological mothers and fathers of children aged 0 to 3 years.

Figure 2.2



Children born with a low birth weight — defined as less than 2,500 grams or 5.5 pounds — face an increased risk of health problems. For instance, they are more likely to die during infancy; roughly two-thirds of infant mortalities are due to low birth weight.⁶ Moreover, low birth weight babies who do survive infancy are at significantly greater risk of suffering developmental disabilities and respiratory tract problems.⁷ While relatively few babies are born at low birth weight in Canada, low birth weight remains an important indicator of child health and of the importance we attach as a society to maternal and child health.

Certain factors in particular have been associated with an increased incidence of low birth weight, including low income and the mother smoking during pregnancy. Results from the NLSCY corroborate these associations, as Table 2.3 shows. (For a more in-depth discussion of prenatal maternal health, see Section 3 below and the research paper by Dr. McIntyre in this publication.)

Overall, the majority of babies in Canada were very healthy: parents reported that 68.8% were in "excellent" health at birth, 19.4% in "very good"

health, 7.3% in "good" health and only 4.5% in "fair or poor" health.*

Temperament

While physical health is one of the most visible measures of a child's well-being, during the early years temperament is also an important feature of child development. When parents share stories about the "terrible twos," they are really talking about how much difficulty their children seem to be having adapting to change or to just being in the world. Being a particularly temperamental child can be an important early indicator of potential problems later in life.⁸

To assess children's temperament, the NLSCY asked parents of children aged 0 to 3 years a number of questions about their child's general mood. The questions can be used to make up different temperament "scales." A scale is composed of the results of a series of specific questions that summarize behaviours, experiences or feelings.

* The question on infant health at birth was asked of biological mothers or fathers of children less than 2 years of age.

Table 2.3. Distribution of children aged 0 to 3 years by birth weight and household income and mother's smoking during pregnancy, 1994–1995

	Normal birth weight (> 2,500 g) (%)	Low birth weight (< 2,500 g) (%)
Family income^a		
< \$30,000	93.5	6.5
\$30,000 – \$60,000	93.7	6.3
> \$60,000	95.8	4.2
Smoking during pregnancy^b		
Smoked	92.2	7.8 ^c
Did not smoke	94.8	5.2

^a Distribution of children aged 0 to 3 years by family income.

^b Distribution of children aged 0 to 2 years by mother's smoking during pregnancy.

^c Estimate less reliable due to high sampling variability.

Source: NLSCY

For the purposes of this research paper, we will look at the difficult temperament scale for children aged 1 to 2 years. Parents were asked questions such as: "how easy or difficult is it for you to calm or soothe him or her when he or she is upset?"; "how many times per day, on average, does he or she get fussy and irritable?"; and "how much does he or she smile and make happy sounds?" The final score on the difficult temperament scale was determined by adding up the values for each question; in this instance, each child received a final score out of 50. It is important to keep in mind that high scores on the scale indicate a tendency toward difficult temperament; high scores do not indicate that these children are troublesome or unmanageable.

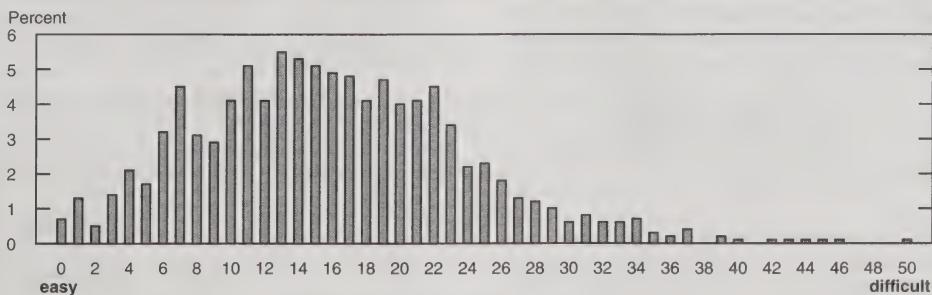
As part of the difficult temperament scale, parents were also asked to rate the overall degree of difficulty their child would present for the average parent. Figure 2.3 presents the distribution of difficult temperament scores.

As we can see, the pattern of responses closely resembles a classic "bell" or "normal" curve (such as one typically finds for a chart of children's heights and weights — where there are a few high and low results, but most are bunched around the mean). The distribution in the chart, with its leftward bias, indicates that the vast majority of children tended to be less rather than more difficult.

Looking at the distribution of scores on a scale is just the first step in understanding a given behaviour or concept such as temperament. These scores open up the discussion of temperament and raise questions such as "what are the characteristics of children with high or low scores for difficult temperament?" These are the types of questions explored in greater detail in the other research papers in this publication. (See the research paper by Dr. Normand et al in this publication for a discussion of temperament.) When future cycles of the NLSCY are completed, it will be possible to

Figure 2.3

Distribution of children aged 1 to 2 years by scores on the difficult temperament scale, 1994–1995



Source: NLSCY

learn more about the influence of temperament on a child's development over time.

Motor and Social Development

The motor and social development (MSD) of young children was also measured. The MSD scale consisted of a set of questions that measured various dimensions of the motor, social and cognitive development of children from 0 to 3 years of age. The questions asked varied according to the age of the child. For example, parents of newborns (0 to 3 months) were asked whether their infant could follow a moving object from side to side. Parents of older children were asked about speech and toilet training. Results were combined into a single scale on which a score of 100 indicated normal development. Children who scored 15 points above or below 100 were considered to have normal motor, social and cognitive development. Those below 85 points displayed symptoms of delayed development, while those above 115 points displayed advanced development.

The NLSCY revealed that equal numbers of girls and boys from 0 to 3 years of age fell within the band of normal development. However, a greater proportion of girls than boys were considered advanced (18.0% compared with 11.3%). The opposite was true of delayed development: parents reported that more boys than girls were delayed. When we look for possible explanations for delayed motor and social development, low birth weight emerges as a probable cause. Table 2.4 reveals that babies born at a low birth weight were more than twice as likely to be assessed as developmentally delayed.

Behaviour

The above three measures primarily assessed how Canada's youngest children were faring. We will now turn to measures of well-being for the older children in the NLSCY sample. In this and the

following two sections, we look at some measures of behaviour, educational performance and relationships with family and friends.

A great deal of attention has been paid to the prevalence of behavioural disorders among children. One study in Ontario, for example, concluded that roughly one in six children suffered from behavioural problems such as conduct disorders and hyperactivity.⁹ The NLSCY provides the first national snapshot of this important area of child development. As subsequent cycles of the NLSCY are completed, we will be able to determine the magnitude and persistence of behavioural problems among children in Canada and whether and how these problems affect children's long-term development.

The NLSCY included a number of behavioural scales, such as the one for temperament, for various age groups.* (Children aged 10 to 11 years also filled out separate questionnaires about their behaviour; these findings are reported below. See also the research paper by Dr. Offord and Dr. Lipman in this publication.)

One aspect of behaviour for children aged 2 to 3 years is "separation anxiety." To determine this, parents of these children were asked, for example, whether their child clung to adults or displayed other signs of dependence. The results of the questions making up the separation anxiety scale were then added together. Figure 2.4 illustrates the resulting distribution of the scores and shows that most children were rated low in anxiety.

* The following behaviours were measured for 4- to 11-year olds: conduct disorder; hyperactivity; emotional disorder; anxiety; indirect aggression; inattention; and prosocial behaviour. Most of the behaviours measured for 2- to 3-year-olds were the same as those for 4- to 11-year-olds; however, separation anxiety and opposition were added, while indirect aggression and some aspects of conduct disorder were not measured. Parents of 10- and 11-year-olds were asked for information about their child's risk-taking behaviours.

Table 2.4. Distribution of children aged 0 to 3 years by motor and social development and low birth weight, 1994–1995

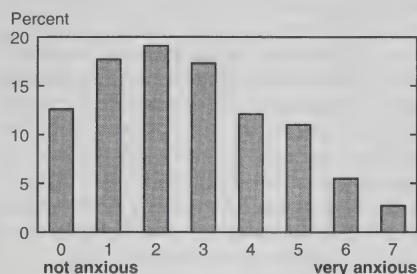
Child outcome	Normal birth weight ($\geq 2,500$ g) (%)	Low birth weight ($< 2,500$ g) (%)
MSD (0 to 3 years)		
Advanced development	14.9	10.5 ^M
Normal development	71.5	58.5
Delayed development	13.5	31.0

^M Estimate less reliable due to high sampling variability.

Source: NLSCY

Figure 2.4

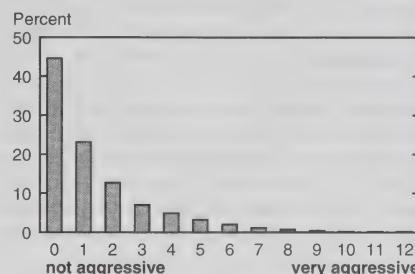
Distribution of children aged 2 to 3 years by scores on the separation anxiety scale, 1994–1995



Source: NLSCY

Figure 2.5

Distribution of children aged 4 to 11 years by scores on the physical aggression scale, 1994–1995



Source: NLSCY

Among older children aged 4 to 11 years, an important aspect of behaviour is their level of physical aggression. (See the research paper by Dr. Tremblay.) To construct a scale of physical aggression, parents were asked questions such as whether their 4- to 11-year-old children got into fights or destroyed their own things. In response to the first question, two-thirds of children in this age group “never” got into fights according to their parents; almost one-third “sometimes” fought with other children; only one in 25 “often” got into fights.

The combined results of these questions are shown in Figure 2.5. There is a decided bias toward “not aggressive,” and the parents of the largest group of children (44.6%) scored zero on the scale, indicating that their children did not engage in physically aggressive behaviours. This finding should not be interpreted to mean that persistent physical aggression is not a problem. Given the long-term problems that aggressive children face and the impact of their behaviour on the children they bully, it will be important to track these children in subsequent cycles of the NLSCY. Greater insight into what goes on in the “black box” will help us identify factors associated with childhood aggression, and this in turn will lay the basis for better strategies to reduce aggressive behaviour.

Education

Educational Experiences

Education is another area commanding a great deal of attention from parents, business, media and

governments. This is in part because of the highly competitive and global nature of the evolving “information economy” and the knowledge and human capital skills it requires. Consequently, concern has focused on the educational system and how children in Canada are performing in school.

The NLSCY provides some basic data on the school experiences of children.¹⁰ Basic information was collected on the child’s grade level, type of school and language of instruction. Another set of questions asked whether the child looked forward to school, whether parents felt good grades were important and whether parents held high expectations for their children’s educational future.¹¹ For example, parents reported that 70.0% of children aged 4 to 11 years “almost always” looked forward to school, 16.8% “often” looked forward to school, and only 13.2% “sometimes,” “rarely” or “never” looked forward to school.

The NLSCY also looked at absenteeism, behavioural problems at school, the incidence of skipping and repeating grades, enrollment in special education classes and tutoring outside of school. As well, the mathematics skills of students in grades 2, 4 and 6 were tested. (The research paper by Dr. Willms in this publication provides a more detailed analysis of the NLSCY math test results.)

Teachers were also interviewed to provide additional information about the children’s educational achievement and behaviour, parents’ involvement in children’s education and the teachers’ teaching practices. Other sources of data

on education will be provided through 10- and 11-year-olds' own impressions of school and through the school principals' questionnaire on the students and characteristics of their school. This information will be available in the second wave of data.

School Readiness

An important element of educational performance is school readiness. Research shows that children who do well in school often approach school "ready to learn." These children have already been exposed to books and numbers, they have been introduced to problem-solving techniques, and they have developed the social skills needed in group settings. All these things provide a base that teachers can build upon to ensure that children develop to their full academic potential. Succinctly stated, children who have been introduced to the basics and have a positive attitude toward learning will do better in school over the long term. This is precisely why researchers agree that preschool programs are so important; they give children an improved chance of doing well in school, heading off problems that can result in diminished life chances and costly interventions down the road.¹²

To measure the degree of school readiness among 4- and 5-year-old children, an NLSCY interviewer administered the Peabody Picture Vocabulary Test (PPVT) for English-speaking subjects, or the Échelle de vocabulaire en images Peabody (EVIP) for French-speaking subjects in the child's home. (Further details about these two tests are provided in the Technical Appendix at the end of this publication.) These tests provide an estimate of a child's verbal ability. The child looks at pictures on an easel and identifies the picture that matches the word the interviewer reads out. As with the motor and social development scale, a score of 100 indicates normal development.

Children who fall 15 points above or below 100 are within the range of normal development. Those under 85 points are considered to have delayed verbal development, while those above 115 are verbally advanced.

Test results show that there were no significant differences between boys and girls on this measure of school readiness. However, there were differences among children according to the educational attainment of their parents. Table 2.5 shows that children who lived with one or two highly educated parents were more likely to do well on the PPVT/EVIP than children who lived with one or two parents who had not graduated from high school.

Relationships

Many of the findings of the NLSCY focus on potential problems that children in Canada face. The behaviour scales looked for the most part at the incidence of behavioural problems. Questions on relationships, by contrast, focused on factors that had the potential for ameliorating the possible negative effects of stressful life experiences or behavioural problems that placed children at risk for adverse long-term outcomes. The strength and quality of a child's relationships proved to be an important preventive factor.¹³

The NLSCY questions about relationships solicited information from parents about how their children aged 4 to 11 years got along with their parents, siblings, teachers, friends and classmates. Ten- and 11-year-olds answered the same set of questions about themselves, the findings of which are presented below.

We learned from parents, for example, that most children aged 6 to 11 years — almost half of

Table 2.5. Distribution of children aged 4 to 5 years by child's school readiness^a and parents' education,^b 1994–1995

Child outcome	Less than high-school graduate (%)	High-school graduate (%)	Diploma/certificate from trade or business school (%)	Degree/diploma from university or college (%)
PPVT (4 to 5 years)				
Advanced development	7.6 ^m	10.4 ^m	12.0 ^m	22.5
Normal development	57.4	73.1	72.6	66.0
Delayed development	35.0	16.6	15.4	11.6 ^m

^a As measured by the Peabody Picture Vocabulary Test (PPVT) or the Échelle de vocabulaire en images Peabody (EVP).

^b Based on the spouse with the highest education credential (in two-parent families).

^m Estimate less reliable due to high sampling variability.

Source: NLSCY

them — had two or three good friends; almost one-third had four or five good friends; and only 10.1% had one friend or no friends at all. This finding was true for both boys and girls. When we looked at how well children aged 4 to 11 years got along with their siblings, parents reported that 27.0% got along "very well," 33.2% got along "quite well" and 33.4% got along "pretty well." According to their parents, only 6.4% of children did not get along with their brothers and sisters.

Some of the questions concerning the quality of relationships have been summarized in a single relationship scale that is scored from 0 to 16, where a high score indicates poor relationships. The distribution of children is presented in Figure 2.6, which shows that the overwhelming majority of children had no or few relationship problems.

Figure 2.6



Child Care

One of the most radical changes in Canada over the past 30 years has been the entry of women into the paid labour force. This has changed the organization of family life considerably as parents have sought alternative care arrangements for their children while they are at work. Because so many children now spend a good deal of time in child care, the availability and quality of that care is an increasingly important issue in understanding and promoting healthy child development. The NLSCY provides some basic information on the care arrangements for children in Canada.

In 1994–1995, 32.4% of children aged 0 to 11 (1.5 million children) were in some form of non-parental child care while their parents worked or studied. Of the children who were not in child care, 39.6% — 1 million children — had been in child care at some point in the past.

Table 2.6* shows the distribution of children who were in child care by type of primary child-care arrangement. The largest proportion (34.2%) were cared for outside the child's home in the home of a non-relative. Roughly equal proportions of children were cared for by a relative such as a grandmother (21.4%) or by caregivers at an organized child-care centre (15.7%). Fourteen percent were cared for in the child's home by a non-relative, such as a nanny. Another 2.5% of children — typically older children — were left in the care of an older sibling or in their own care. Of the 1.5 million children in non-parental care, 26.9% were in regulated care.

* Due to a questionnaire design problem in Cycle 1, the proportion of children in their own care is underestimated.

Table 2.6. Distribution of children aged 0 to 11 years by type of non-parental child-care arrangement, 1994–1995

Primary care arrangement	%
Unrelated family home day-care, unregulated	34.2
Care by relative, in child's or someone else's home	21.4
Regulated child-care centre	15.7
In child's home by non-relative, unregulated	14.2
Unrelated family home day-care, regulated	7.2
Before- or after-school program, regulated	4.0
Sibling or self-care	2.5
Other	0.7 ^m

^m Estimate less reliable due to high sampling variability.

Source: NLSCY

Table 2.7. Distribution of children aged 0 to 11 years by type of non-parental child care and number of hours in care, 1994–1995

Primary care arrangement	Hours in primary care arrangement					
	< 10 hours (%)	10–19 hours (%)	20–29 hours (%)	30–39 hours (%)	≥ 40 hours (%)	Total (%)
Unrelated family home day-care, unregulated	28.6	24.3	17.0	11.8	18.4	100.0
Care by relative in child's or someone else's home	28.5	24.0	15.3	11.3	20.9	100.0
Regulated child-care centre	16.3	21.4	15.4	18.1	28.8	100.0
In child's home by non-relative, unregulated	25.3	23.8	17.5	9.9	23.5	100.0
Unrelated family home day-care, regulated	16.3	21.0	21.9 ^M	15.1 ^M	25.7	100.0
Before- or after-school program, regulated	45.5	39.4	12.0 ^M	u	u	100.0
Sibling or self-care	64.4	29.4 ^M	u	u	u	100.0
Other	u	u	u	u	u	100.0
Total	27.0	24.1	16.2	12.1	20.6	100.0

^M Estimate less reliable due to high sampling variability.

^u Estimate too unreliable to publish.

Source: NLSCY

Table 2.7 shows the number of hours children in Canada spent in their primary child-care arrangement. The overall pattern suggests that children tended to spend either a little or a lot of time in care; relatively few spent an intermediate amount of time in care. Roughly equivalent proportions of children spent less than 10 hours, between 10 and 19 hours, and over 40 hours per week in non-parental care. On average, children spent 21.2 hours per week in their primary care arrangement.

Stability is one of the most important aspects of a high-quality child-care experience for young children. Constantly changing care arrangements disrupt children, who need time to adjust to new settings. A long-term relationship with a caregiver is an important factor in encouraging positive child development.

Most children had fairly stable care arrangements. In 1994–1995, more than three-quarters (77.0%) of the children did not experience a change in their primary care arrangements in the previous year, while 15.8% experienced one change, 4.3% two changes, and 2.9% three or more changes.

Table 2.8 presents the most common explanations for moving a child from one care setting to another. The main reason — in almost one-third of the cases — was that a caregiver or program was no longer available. Other reasons included dissatisfaction with the caregiver or program, a family move or change in custody arrangements, and the child's changing needs. In some cases a preferred child-care arrangement, such as a subsidized child-care space, became available.

Table 2.8. Distribution of children aged 0 to 11 years by explanation for change in child-care arrangement, 1994–1995

Reason for changing child-care arrangement ^a	Number of children	%
Caregiver or program no longer available	98,100	30.5
Family moved, parental work status or custody arrangement changed	40,700	12.3
Dissatisfaction with caregiver or program	36,000	11.2
A preferred arrangement became available	35,200	11.0
Changes in child's needs	30,200	9.4
Other reasons	82,200	25.6
Total	322,400	100.0

^a Includes those children whose parents gave only one reason (92%) for changing their care arrangement; estimate to unreliable to report those children whose parents gave more than one reason (8%) for changing care arrangements.

Source: NLSCY

Children in Canada: What Are 10- and 11-year-olds Saying?

A unique feature of the NLSCY is that older children in the survey were asked to fill out a questionnaire on various aspects of their lives, including their experiences in school, their perceptions of their relationship with their parents, and involvement with drugs and alcohol. Since similar information was obtained from parents and teachers, it will be possible to compare answers.

Views on Parenting

Three parts of the 10- and 11-year-olds' questionnaire results are being released in the first wave of NLSCY data: views on parenting; behaviour; and relationships. On the first topic of parenting, specific questions were asked that, when combined in three scales, attempt to measure the children's perception of their relationship with their parents. One of these is the parental rejection scale, based on questions such as: "do your parents nag you about little things?" and "do they only keep rules when it suits them?"

The parental rejection scale was constructed on the basis of answers to these types of questions; the results are presented in Figure 2.7. The leftward bias of the distribution suggests that few children perceived their relationship with their parents as negative or hostile.

Figure 2.7



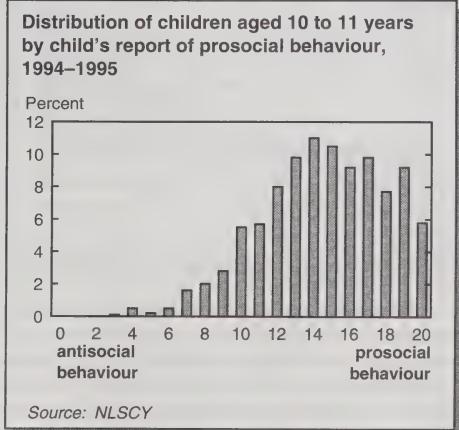
Behaviour

The questions in the self-completed behaviour questionnaire for 10- and 11-year-olds were identical to the questions asked of parents. Information was collected on the following behaviours: conduct disorders, hyperactivity, physical aggression, indirect aggression, emotional disorder, property offences, risk-taking and prosocial behaviour.

We have chosen to look at the prosocial behaviour scale to gain some insight into the thinking of 10- and 11-year-olds about their behaviour. Research shows that prosocial behaviour is an important personality trait that bolsters self-esteem and helps children deal with change in their lives.¹⁴ This scale was based on questions asked of the 10- and 11-year-olds, such as: "are you helpful and kind to other people?", "do you show sympathy for others' mistakes?"; and "do you clean up other people's messes?"

The resulting prosocial behaviour scale is presented in Figure 2.8, and the strong rightward bias of the distribution strongly suggests that most children adopted a caring attitude toward others. Less than 10% had scores under 10, indicating that they had more of an "antisocial" attitude to others than the vast majority of children this age.

Figure 2.8

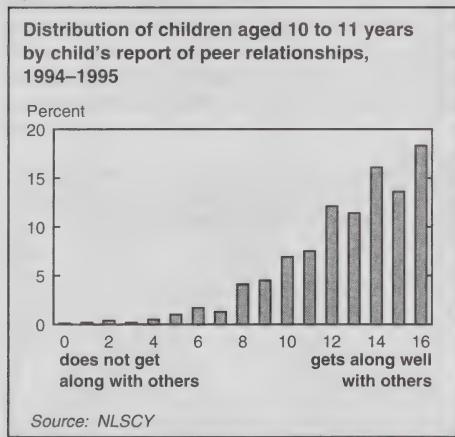


Children indicated that they were more caring toward others than their parents reported. When we compare the responses of parents and children to the question "will (your child/you) invite bystanders to join in a game?" 44.9% of 10- and 11-year-olds said they did so "often." However, the parents of only 32.1% of children said that their 10- and 11-year-olds behaved in this way. Both children and parents agreed that about 10% "never" invited others to join in their games.

Relationships

Ten- and 11-year-olds were also asked questions about their relationships that mirrored the questions answered by their parents. Children were asked, for example, about the quality of their relationships with others (including friends, parents and siblings), the number of close friends they had, and whether they had someone in whom they could confide. The results for the peer relationships scale, presented in Figure 2.9, strongly indicate that most 10- and 11-year-olds felt they got along well with their friends.

Figure 2.9



When we compare the answers of parents and children to the question "how well do(es) (your child/you) get along with other children?" we again find differences. According to the parents of 10- and 11-year-olds, 56.7% of children got along "very well" with their peers, while another 30.6% got along "quite well." On the other hand, 30.4% of children reported that they got along "very well" with their friends, while 48.4% claimed that they get along "quite well." Finally, 4.2% of children acknowledged that they did not get along "too well" or "at all" with

their peers; this compares to parental reports of 1.3%.*

3. A Portrait of Children's Families, 1994-1995

Children in Canada: What Types of Families Do They Live In?

The NLSCY reveals that children in Canada were doing fairly well on the whole. But there were groups of children who continued to experience difficulties and consequently were at risk for developing problems or not meeting their potential over the long term. This brings us back to the "black box," to the investigation of how factors and conditions interact to produce certain child development outcomes. Why do some children do better than others?

To gain a better understanding of the complex "black box" interactions that influence development, the NLSCY collected extensive data on two of the main environments: the family and the school. Information on families in Canada being released in the first wave of NLSCY data is presented below in the following brief portrait of families in Canada.¹⁵

Family Types

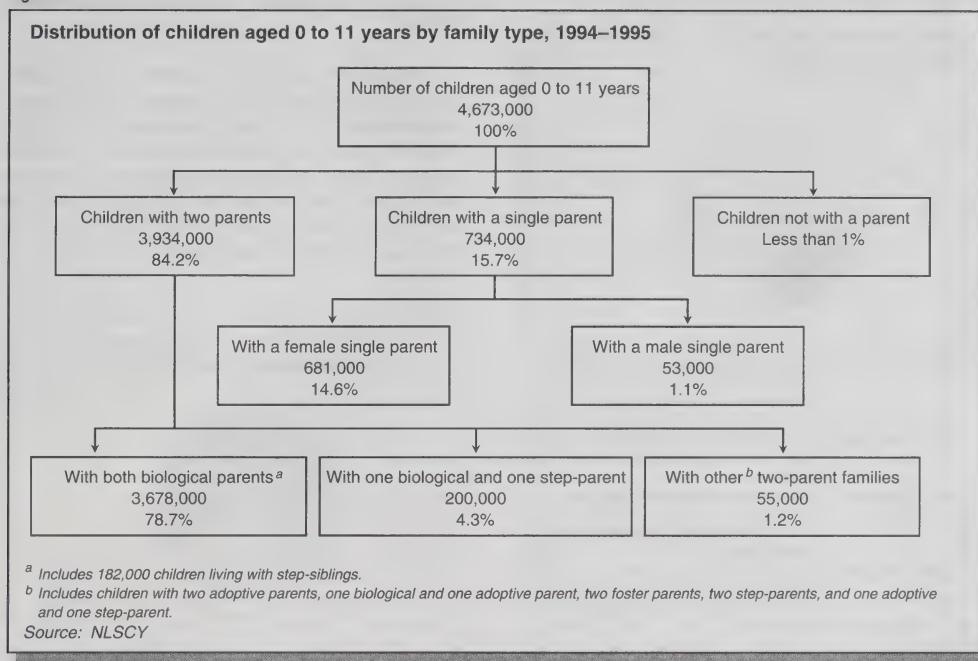
Figure 3.1 reveals that 84.2% of children in Canada aged 0 to 11 years lived in a two-parent family, 15.7% lived with a single parent and less than 1.0% lived with someone other than a parent (typically another relative or a guardian). Among children with single parents, the vast majority (92.8%) lived with a single mother. Perhaps one of the most striking findings of the survey is that of all children aged 0 to 11 years, 78.7% lived with their biological parents in two-parent families.

As a result of the climbing rate of divorce in past decades, more children are growing up with a step-parent.[†] The survey reveals that 8.6% of children were living in step-families. Figure 3.2 demonstrates that there are many varieties of step-families, depending on whose children are living in the family. The figure shows that 25.6% of all

* This is a qualified estimate that is less reliable due to the high sampling variability.

[†] Statistics Canada defines "step-families" as married or common-law couples with children where at least one child is in a step-relationship with at least one of the parents.

Figure 3.1



children in step-families were living with their biological mother and her children and a stepfather (but none of his children). However, the largest group of children in step-families (51.3%) included a mother and father, her (but none of his) children from previous relationship(s), and children of the current relationship. By contrast, only 3.4%* of children lived with their biological father and a stepmother (but none of her children). (See the research paper on step-families by Dr. Cheal in this publication.)

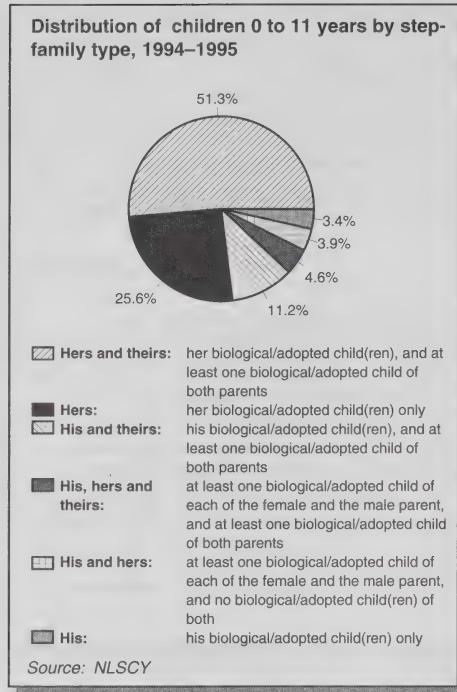
It is important to remember that these data capture one moment in time. In 1994–1995, 24.3% of children in Canada aged 0 to 11 years were living with a single parent (15.7%) or in a step-family (8.6%). Many of the younger children in the survey will likely experience the separation or divorce of their parents at some point in the future; consequently, many will spend some time living in a single-parent or blended family. According to one study, the number of young children involved in a marital break-up has tripled in the past 20 years:

while 8% of children in Canada born in the early 1960s experienced their parents' separation by the time they turned 6 years old, 18% of children born in the early 1980s saw their parents separate by age 6.¹⁶ The great value of the NLSCY is that we will be able to trace the movement of children through different family configurations over time so we can begin to understand its effects on child development.

On their own, these statistics present a snapshot of the types of families in which children are growing up. The figure that stands out is the number of children aged 0 to 11 years who are living with one parent. Table 3.1 shows that this group has grown significantly over the past 30 years: in 1961, 11% of families with children were headed by a single parent; in 1991, 20% of families were. In turn, the number of two-parent families dropped from 89% to 80% over the same time period.¹⁷ The impact of this significant shift in family structure raises many important social and economic questions today.

* This is a qualified estimate that is less reliable due to the high sampling variability.

Figure 3.2



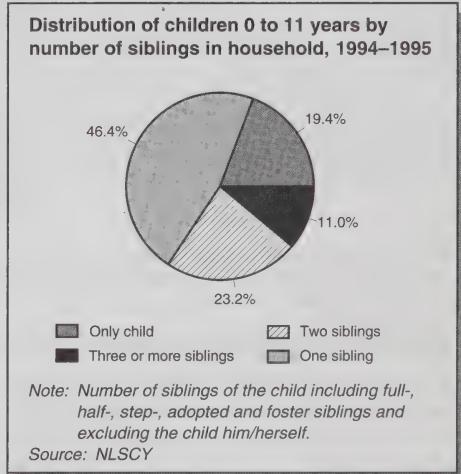
Number of Siblings

The other dimension of family life highlighted by the NLSCY is the number of siblings children have. However, it must be cautioned that since the survey is dealing predominantly with younger families, many will be larger in the future if and when parents decide to have more children. Therefore, while the information presented here is accurate regarding the number of siblings in each household surveyed in 1994-1995, the data do not necessarily provide

an accurate picture of typical family size in the 1990s.

Figure 3.3 presents the number of siblings — covering the ages 0 to 18 years — in children's households. The largest proportion of children (46.4%) had only one other brother or sister. Another 19.4% of children aged 0 to 11 were (as yet) an only child, while one-third had two or more siblings. On average, a child in Canada between the ages of 0 and 11 years had 1.3 siblings.

Figure 3.3



When we look at the number of siblings children had by province (Table 3.2), we find that the provincial picture approximates the national data. The percentage of only children, for example, was slightly higher in Quebec and Newfoundland, while it was lower in Prince Edward Island, Nova Scotia, Saskatchewan and Alberta.

Table 3.1. Families with children, 1961-1991

Year	Families headed by female single parents (%)	Families headed by male single parents (%)	Single-parent families (%)	Two-parent families (%)
1961	9.0	2.5	11.4	88.6
1966	9.0	2.2	11.2	88.8
1971	10.4	2.8	13.2	86.8
1976	11.6	2.4	14.0	86.0
1981	13.7	2.9	16.6	83.4
1986	15.5	3.3	18.8	81.2
1991	16.5	3.5	20.0	80.0

Source: Statistics Canada, Lone-parent families in Canada, 1992.

Table 3.2. Distribution of children aged 0 to 11 years by number of siblings and by province, 1994–1995

Province	Only child (%)	One sibling (%)	Two siblings (%)	Three or more (%)	Total (%)
Newfoundland	21.3	48.9	23.1	6.6 ^m	100.0
Prince Edward Island	15.7 ^u	38.7 ^m	30.6 ^m	15.0 ^u	100.0
Nova Scotia	16.7	47.4	27.3	8.6 ^m	100.0
New Brunswick	19.6	46.9	24.4	9.2 ^m	100.0
Quebec	24.0	45.6	22.6	7.8	100.0
Ontario	18.5	48.1	22.4	11.0	100.0
Manitoba	18.5	40.1	29.9	11.4	100.0
Saskatchewan	14.7	39.8	28.9	16.6	100.0
Alberta	16.6	43.0	24.2	16.1	100.0
British Columbia	18.0	49.1	20.4	12.6	100.0
Canada	19.4	46.4	23.2	11.0	100.0

^m Estimate less reliable due to high sampling variability.

^u Estimate does not meet Statistics Canada's quality standard. Conclusions based on these data will be unreliable, and most likely invalid.

Source: NLSCY

Women used to have a large number of births, in part because many children died in early childhood. Moreover, families in an agriculture-based economy needed as many hands as possible to ensure the survival of the family unit. But increases in the wealth and health of Canadians, particularly women, during the twentieth century triggered a decline in the birth rate. In addition to changes in our economic and industrial structure, the introduction of income security programs, better contraception methods and public health services in the postwar period played a critical role in improving the well-being of individuals and families over the course of their lives, and in reducing births. The conditions under which families have children have substantially changed. The days of large families appear to be over.

Age of Parents

Just as couples are deciding to have fewer children, they are having children at later ages. The average age of mothers at the birth of their first child was 26.6 years in 1992, up from 23.3 years in 1971. The average age at the birth of their second child was 29 years in 1992, up from 25.9 years in 1971.^{2,18}

According to the findings of the NLSCY, the average age of mothers and fathers of children aged 0 to 11 was 33.8 years and 36.6 years, respectively. When we look at average age by family type, a mother in a single-parent family was only slightly younger than a mother in a two-parent family — that is, 32 years compared with 34 years.

For single fathers, the situation was reversed. Typically, a single male parent with children in this age group was 37.5 years, while the average age of a father in a two-parent family was 36.6 years. It should be emphasized that all parental ages provided in this section refer to the parent's age at the time of the survey and not their age at the children's birth.

Some interesting findings emerge in the distribution of children by parents' ages (Table 3.3). Perhaps contrary to popular perception, only a very small proportion (0.4%) of children lived with teen mothers. However, even though the numbers were relatively small, this group of children demands particular attention because of the heightened risk of growing up in a poor household and having poor child outcomes. (See the research paper by Dr. Lipman et al.) The majority of children lived with mothers (61.8%) and fathers (59.7%) aged 30 to 39. Only a relatively small percentage of children aged 0 to 11 years lived with parents over the age of 44 years.

Since the educational, income and work experiences of young parents — especially single mothers — tend to be quite different from those of older parents, parents' age is an influential factor on children. Table 3.4 presents the distribution of children according to the age of the older parent and family type. Among two-parent families, 8.9% of children lived with young parents (less than 30 years of age). However, in single-parent families — overwhelmingly female headed — 34.7% were being raised by a young parent.

Table 3.3. Children aged 0 to 11 years by age of parents, 1994–1995

Age of mother	Number of children	%	Age of father	Number of children	%
15 to 19	20,700	0.4	15 to 19	0	0
20 to 24	222,000	4.8	20 to 24	62,500	1.6
25 to 29	772,700	16.7	25 to 29	372,400	9.4
30 to 34	1,529,300	33.1	30 to 34	1,073,600	27.0
35 to 39	1,326,600	28.7	35 to 39	1,303,800	32.7
40 to 44	581,000	12.6	40 to 44	752,400	18.9
45 to 49	143,700	3.1	45 to 49	325,300	8.2
50 to 54	18,400	0.4 ^M	50 to 54	68,900	1.7
55 to 59	0	0	55 to 59	21,000	0.5

^M Estimate less reliable due to high sampling variability.^U Estimate too unreliable to publish.^a Age of parents at time of survey, not age at time of child's birth.*Source: NLSCY***Table 3.4. Distribution of children aged 0 to 11 years by age of older parent and family type, 1994–1995**

Age of older parent	Two-parent family (%)	Single-parent family (%)	All households (%)
< 30 years	8.9	34.7	13.1
≥ 30 years	91.1	65.3	86.9

Source: NLSCY

The above results concerning parents' age indicate that the most intensive period of child-rearing is likely to occur when parents are in their thirties. This marks a shift from earlier decades when young men and women married and had children in their early twenties. One implication of this is that many more children are likely to live in families where one or both parents have a more secure footing in the labour market — and, hence, relatively higher incomes — than children being raised by parents under the age of 30. Children living with older parents are likely to have a different set of experiences in terms of activities. They may also have a different kind of relationship with their grandparents, who will in turn be older. Delaying family formation represents an important environmental input into the "black box" of child development, the implications of which will be more fully understood as results from the NLSCY are analysed over time.

Children in Canada: What Are the Socioeconomic Characteristics of Their Families?

We know that the family setting is a critical influence on child development.¹⁹ Below, we look at some of

the most important socioeconomic characteristics of families in Canada that have been identified as key determinants of child well-being. These include household income and parents' labour-market status and education. In addition, the NLSCY provides information on maternal prenatal health and family dynamics. With this information, we can begin to look at how environmental factors such as household income affect child development; some initial findings are presented in the conclusions of this research paper.

Household Income

The well-being of children is clearly linked to the family's financial resources, particularly the level, source and stability of these resources. Children raised in financially secure homes may not always be the healthiest or happiest, but they will not typically face the same difficulties that children in poor families experience. Household income is a basic indicator of child well-being.²⁰ A child who does not eat a good breakfast will not be able to concentrate on learning; a child who lives in a crowded home in poor repair will be more likely to suffer from poor health.

Children who grow up in poor or low-income families also tend toward lower levels of educational

achievement and labour-market attainment compared with children from more affluent families. They are affected by growing up in financially insecure homes and the frequent moves and school changes often necessitated by a drop in household income. Yet, while we are certain that family financial resources are associated with many aspects of child development, we are not as certain of the various ways the influence is transmitted. It can be through nutrition, stress, health care, access to material goods, self-esteem, neighbourhood influence and so on. The value of the longitudinal NLSCY is that it will permit researchers to better document not only the influence of financial resources on child development, but also the ways — both direct and indirect — in which the influence is felt.

Level of Income

To provide a simplified overview of the distribution of children by level of household income, we established three household income groups. These income groups and the distribution of children are presented in Table 3.5 for Canada and the provinces. It should be noted that the definition of income is "before-tax" income, and it includes government transfers such as unemployment insurance, social assistance and child benefits. Total income includes the incomes of all members normally living in the same household as the child.

As the table shows, 25.7% of children in Canada aged 0 to 11 years lived in households with incomes under \$30,000 per year; 41.6% were in

households with total incomes from \$30,000 to \$60,000 per year; and 32.8% lived in higher-income households with more than \$60,000 per year. For reference, the average income of all these households was \$49,900, while the median income was \$45,000.

Examining the household income data by province shows that Newfoundland had the largest proportion of children living in the lowest-income group: 41.6% of all children aged from 0 to 11 years. All of the Atlantic provinces had relatively high proportions of children living in the lowest-income households. By contrast, Ontario, British Columbia and Alberta — Canada's wealthiest provinces — had the smallest proportions of children living in the lowest-income group and the largest proportions living in the highest-income group.

Child Poverty

There is no official definition of poverty in Canada, but the most widely accepted and used measure is the one based on Statistics Canada's "low income cut-offs" (LICO; it should be noted that Statistics Canada is careful not to refer to these cut-offs as poverty lines).^{*} Table 3.6 presents an overview of child poverty rates for Canada and the provinces. Nationally, a total of 24.6% of children in Canada aged 0 to 11 years were poor. By province, Newfoundland had the highest percentage of poor children (33.1%) followed by Manitoba (28.9%).

* In 1994, Statistics Canada's low income cut-off for a family of four in an urban centre with 100,000 to 499,000 residents was \$22,039.

Table 3.5. Distribution of children aged 0 to 11 years by household income and by province, 1994–1995

	Household income			
	< \$30,000 (%)	\$30,000–\$60,000 (%)	> \$60,000 (%)	Total (%)
Newfoundland	41.6	38.4	20.0	100.0
Prince Edward Island	35.2 ^M	49.5 ^M	15.2 ^U	100.0
Nova Scotia	33.8	44.5	21.7	100.0
New Brunswick	30.8	51.6	17.6	100.0
Quebec	27.1	45.9	27.0	100.0
Ontario	23.3	38.5	38.2	100.0
Manitoba	30.4	43.2	26.4	100.0
Saskatchewan	32.2	42.4	25.4	100.0
Alberta	22.5	41.0	36.4	100.0
British Columbia	23.7	39.1	37.3	100.0
Canada	25.7	41.6	32.8	100.0

^M Estimate less reliable due to high sampling variability.

^U Estimate does not meet Statistics Canada's quality standards. Conclusions based on these data will be unreliable and most likely invalid.

Source: NLSCY

Table 3.6. Distribution of children aged 0 to 11 years by province, 1994–1995

Province	Poor ^a (%)	Non-poor (%)	Total (%)
Newfoundland	33.1	66.9	100.0
Prince Edward Island	25.9 ^b	74.1	100.0
Nova Scotia	26.8	73.2	100.0
New Brunswick	23.3	76.7	100.0
Quebec	25.6	74.4	100.0
Ontario	23.9	76.1	100.0
Manitoba	28.9	71.1	100.0
Saskatchewan	26.5	73.5	100.0
Alberta	23.7	76.3	100.0
British Columbia	22.1	77.9	100.0
Canada	24.6	75.4	100.0

^a Poverty is measured using Statistics Canada's low income cut-offs (LICO).

^b Estimate less reliable due to high sampling variability.

Source: NLSYC

British Columbia had the lowest rate (22.1%). With the exception of Newfoundland and Manitoba, the provincial rates were quite closely bunched around the national average.

Table 3.7 provides a picture of child poverty by family type. Children living in single-parent families were much more likely to be poor than children living in two-parent families: 68.0% compared with 16.5%. The child poverty rate was highest for children living in families headed by a single mother (70.9%). It was significantly lower for children living with a single father (30.7%).* Although not shown in the Table, younger children were more likely to live in poor families than older children: infants were over 20% more likely to be poor than 11-year-olds. This is primarily because young families have higher poverty rates.

* This is a qualified estimate that is less reliable due to the high sampling variability.

^t The source of income is also important from an intergenerational point of view: children who grow up in a family that relies on social assistance may be more likely to turn to social assistance themselves.

Source of Income

Source of income is an important factor in determining the level of economic security for children.^t As Table 3.8 illustrates, 85.4% of children lived in households whose principal source of income was wages and salaries or earnings from self-employment. If children did not live in a household whose main source of income was employment and earnings, they were most likely to depend on social assistance ("welfare"). One in 10 children in Canada lived in a household whose main source of financial support was social assistance.

Table 3.9 shows that source of income varies considerably by province of residence. The proportion of children living in households that relied on wages and salaries or self-employment income ranged from a high of 92.8% in Alberta to a low of 67.7% in Newfoundland. Almost one-quarter (23.4%) of children in Newfoundland lived in a household whose main source of income was social assistance or unemployment benefits (not shown in table).

Table 3.7. Distribution of poor^a children aged 0 to 11 years by family type, 1994–1995

Family type	Poor ^a (%)	Non-poor (%)
Two-parent family	16.5	83.5
Single-parent family	68.0	32.0
Female single parent	70.9	29.1
Male single parent	30.7 ^b	69.3

^a Poverty is measured using Statistics Canada's low income cut-offs (LICO).

^b Estimate less reliable due to high sampling variability.

Source: NLSYC

Table 3.8. Distribution of children aged 0 to 11 years by main source of household income, 1994–1995

Main source of household income	Children (%)
Wages and salaries	74.6
Self-employment	10.8
Social assistance	10.1
Unemployment insurance	1.5
Miscellaneous ^a	1.0
Child tax benefit	0.9
Pensions ^b	0.4
Worker's compensation	0.3 ^M
Child support	0.3 ^M
Dividends and interest	0 ^U
Alimony	0 ^U
Total	100.0

^a Includes other government assistance, rental income, scholarships, etc.

^b Includes Canadian and Quebec Pension Plans, Old Age Security and Guaranteed Income Supplement, retirement pensions, superannuation and annuities.

^M Estimate less reliable due to high sampling variability.

^U Estimate too unreliable to publish.

Source: NLSCY

Parents' Labour-market Status

The NLSCY paints a detailed picture of the employment status of Canadian parents in Table 3.10. Among two-parent families, 35.5% of children aged 0 to 11 years had both parents in the labour market full-time. Almost the same proportion (33.2%) lived in families where one parent was employed full-time and the other parent was not in paid employment. Only 6.6% lived in homes where neither parent was employed. This was in stark contrast to children in single-parent homes, where the majority (54.9%) lived with a parent who was not employed at all.

Although it is not directly discernible from Table 3.10, 84.5% of all children in Canada aged 0 to 11 years lived in families where either one or both parents were involved in paid labour on a full-time or part-time basis. This summary figure highlights what has been a profound shift in work and family life over the past 30 years. What is particularly striking is that the majority of women with children are now in the labour force. The employment rate of women with children has risen substantially, particularly for women in their key child-rearing years. Between 1981 and 1994, for example, the employment rate of women with children under 16 years of age rose from 50% to 63%. The increase

Table 3.9. Distribution of children aged 0 to 11 years by main source of household income by province, 1994–1995

Province	Main source of income			
	Wages and salaries ^a (%)	Social assistance (%)	Other ^b (%)	Total (%)
Newfoundland	67.7	13.9 ^M	18.4 ^M	100.0
Prince Edward Island	87.6	6.7 ^U	5.7 ^U	100.0
Nova Scotia	80.8	12.8	6.4 ^M	100.0
New Brunswick	84.5	8.5 ^M	6.9 ^M	100.0
Quebec	86.6	10.0	3.4	100.0
Ontario	83.9	11.4	4.7	100.0
Manitoba	88.7	8.8 ^M	2.5 ^U	100.0
Saskatchewan	84.7	9.7 ^M	5.5 ^M	100.0
Alberta	92.8	4.3	2.9 ^M	100.0
British Columbia	84.7	10.7	4.6	100.0
Canada	85.4	10.1	4.5	100.0

^a Includes earnings from self-employment.

^b For other, see Table 3.8; all sources other than wages and salaries, self-employment earnings and social assistance.

^M Estimate less reliable due to high sampling variability.

^U Estimate does not meet Statistics Canada's quality standards. Conclusions based on these data will be unreliable, and most likely invalid.

Source: NLSCY

Table 3.10. Distribution of children aged 0 to 11 years by labour-market status of parent(s), 1994–1995

	Two-parent families (%)	Single-parent families (%)
Both full-time (except single-parent)	35.5	34.1
One full-time, one part-time	21.8	n/a
One full-time, one none	33.2	n/a
Part-time only ^a	2.9	10.9
Not employed	6.6	54.9

^a Includes two-parent families where one parent is employed part-time and the other is employed part-time or not employed.

n/a Not applicable.

Source: NLSCY

was even greater for women with preschool children.²¹

Table 3.11 shows some interesting regional differences. Among two-parent families, the prevalence of full-time work among the parents of children aged 0 to 11 years was greatest in central Canada. By contrast, more children in western Canada lived in families where one parent, most often the father, worked full-time, and the other parent, most often the mother, worked part-time. Children in Atlantic Canada were more likely than those in the rest of the country to live in a two-parent family where both parents were unemployed or not in the labour force.

This pattern is reversed when we look at children in single-parent families. Children in single-parent families in western Canada were more likely to live with a full-time worker than children in central or Atlantic Canada.

Parents' Education

In trying to understand the environmental factors that influence child development, parents' education — along with financial resources and labour-market status — has been associated with child outcomes such as academic achievement. But, as mentioned earlier with respect to financial resources, while parents' education appears to have a strong association with child development outcomes, we are not certain of the pathway of influence.

For example, if parents have gainful employment, the family will have an adequate income, which is a key resource in building a healthy, stable environment for children.²² Parents' education is linked to household income in that those with higher educational credentials — especially in the new information- and knowledge-based economy — are more likely to hold higher-

Table 3.11. Distribution of children aged 0 to 11 years by parents' labour-market status by region, 1994–1995

	Both full-time (%)	One full-time, one part-time (%)	One full-time, one none (%)	Part-time only ^a (%)	Neither employed (%)
Two-parent families					
Atlantic	31.0	14.5	38.4	3.1	13.1
Central	38.4	18.9	33.0	2.9	6.8
Western	30.5	30.0	32.2	2.9	4.4
Canada	35.5	21.8	33.2	2.9	6.6
Single-parent families					
Atlantic	26.7	n/a	n/a	11.6 ^b	61.8
Central	33.7	n/a	n/a	9.2	57.1
Western	37.2	n/a	n/a	14.4	48.4
Canada	34.1	n/a	n/a	10.9	54.9

^a Includes two-parent families where one parent is employed part-time and the other is employed part-time or not employed.

^b Estimate less reliable due to high sampling variability.

n/a Not applicable.

Source: NLSCY

Table 3.12. Distribution of children aged 0 to 11 years by mothers' and fathers' highest educational level, 1994–1995

Level of education	Mothers' education (%)	Fathers' education (%)
Less than high school	16.3	16.3
High-school graduate	46.4	40.5
Diploma/certificate from trade or business school	8.9	13.2
Degree/diploma from university or college	28.3	29.9
Total	100.0	100.0

Source: NLSCY

paying jobs. Parents' education is also associated with the value placed on education within the family. Parents with higher levels of education tend to place a higher value on the importance of academic achievement and are more likely to spend more time and energy on, for example, reading to their children and helping them with their homework. Both of these parental activities set children on a more secure footing in school. In particular, mothers' education has been linked to positive academic outcomes for children.²³ The NLSCY will eventually help us better understand the ways in which a factor like parents' education influences child development.

In the NLSCY, parents were asked to indicate the highest level of education attained at the time of the interview (some were still continuing their education). Two points stand out in the results summarized in Table 3.12. First, the largest number of children aged 0 to 11 years lived with parents who held a high school diploma. Second, fathers were on average somewhat more highly educated than mothers, but the gap was small. What these data do not show is the important and significant increase in the general level of education over the past decades, especially among women. The parents of young children today are more highly educated than at any time in the past.

Prenatal Maternal Health

The family characteristics discussed so far included important socioeconomic features of families in Canada: the level and source of household income, the employment status of parents and their level of educational attainment. Prenatal maternal health is of a different order, but it is no less a key environmental influence on child development outcomes. The health of mothers during pregnancy is highly correlated with the health of infants at birth. For example, mothers who smoke or consume alcohol throughout their pregnancies are much

more likely to have low birth weight babies. Low birth weight, as discussed earlier, is a key risk factor for poor health, disability and lower educational attainment. (See the research paper by Dr. McIntyre in this publication.)

The importance of good prenatal care cannot be stressed enough. Frequent studies have concluded that prenatal care is important to healthy child outcomes. Therefore, it is welcome news that the mothers of the overwhelming majority of children received some form of prenatal care. In fact, only 2.5% of children aged 0 to 2 years in the survey had mothers who received no care. The mothers of 92.4% of children were monitored by a doctor and 2.9% were monitored by a nurse. In only relatively few instances did the child's mother receive care from a midwife (1.4%),* but these figures may change as midwives become more common in Canada.

The NLSCY also provides information about some of the health risks that can influence healthy birth outcomes. For example, the mothers of one in four children (23.6%) smoked during their pregnancy. Fewer mothers, however, consumed alcohol while pregnant. The mothers of 82.5% of children reported they consumed no alcohol at all, 13.8% had less than one drink per month, 2.6%[†] consumed one to three drinks a month, and only 1.0%[‡] had a drink more than once a week.[§]

As a point of interest, 81.9% of infants were born "naturally" in 1994–1995; 18.1% were born by Caesarean section. Birthing aids such as forceps

* This is a qualified estimate that is less reliable due to the high sampling variability.

† This is a qualified estimate that is less reliable due to the high sampling variability.

‡ This is a qualified estimate that is less reliable due to the high sampling variability.

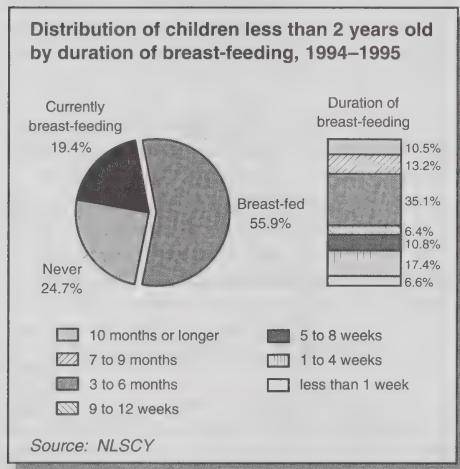
§ The biological parents of children aged 0 to 2 years were asked questions on prenatal care, health risks during pregnancy, postnatal maternal health, and breast-feeding.

or a cupping glass were used in the birth of almost one in seven of the children born without Caesarean section.

Maternal health after the birth is also an important influence on healthy child development. Some mothers need to recover from complications arising from the birth of their children. For example, the mothers of 6.6% of children reported that they hemorrhaged after the birth; another 5.2% had a postpartum infection. The incidence of postpartum depression, however, was much higher. One in five children (20.1%) had mothers who indicated they were depressed for a period of time after the birth of their child.

Mothers of infants and toddlers (under 2 years) were asked whether they breast-fed their children. As Figure 3.4 shows, over three-quarters (75.3%) of these children had been or were being breast-fed. However, 41.2% of those breast-fed were breast-fed for 12 weeks or less (26 weeks is considered the ideal period). Mothers reported that concerns about insufficient milk and a return to work were the principal reasons they stopped breast-feeding.

Figure 3.4



Children in Canada: What Is Happening in Their Families?

The NSLCY included a number of questions about the status of family relationships. These questions attempted to examine less tangible and quantifiable

environmental influences, such as parenting style or levels of social support, that affect children as they grow and develop. This first wave of NSLCY data provides information on four different influences: parental depression, parenting style, family functioning and parental social support.

Parental Depression

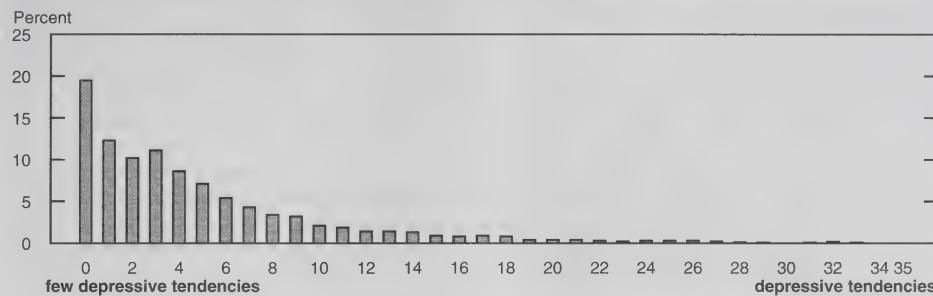
Child development is influenced by the parents' mental health in various ways.²⁴ Depressed parents are usually withdrawn, tired, despondent and pessimistic about the future. None of these parental traits is likely to have a healthy influence on children. To determine whether a parent exhibits depressive symptoms, the survey posed a number of questions to the parent about his or her state of mind. Respondents were asked how often over the previous week they had experienced certain feelings, ranging from "rarely" (less than one day) to "most or all of the time" (five to seven days).

For example, parents filling out the questionnaire were asked whether they felt they could "not shake off the blues even with help from my family or friends" during the previous week. In response to this question, the parents of 80.3% of children aged 0 to 11 years said they did not feel or rarely felt this way. Another 11.5% of children lived with a parent who felt this way perhaps one or two days a week; 5.2% lived with a parent who reported feeling this way three or four days a week; and the parents of 3.1% of children felt this way most of the time.

Parents' answers to the various questions concerning depression were used as the basis for developing a depression scale (see Figure 3.5). It is important to keep in mind that high scores on the depression scale (ranging from 0 to 35) indicate only symptoms of depression; they do not necessarily indicate that a parent is clinically depressed. The predominant leftward bias of distribution in the chart strongly indicates that the vast majority of children were living with parents with few depressive tendencies. One note on survey methodology is important here: the survey asked only one parent (the PMK) the questions concerning depressive symptoms. Consequently, in the case of two-parent families, we do not know whether the other parent had depressive tendencies that could equally influence the child.

Figure 3.5

Distribution of children aged 0 to 11 years by scores on the parental depression scale, 1994–1995



Source: NLSYC

Parenting Style

Parenting style significantly influences the relationship between a child and parent, as well as other family relationships, yet it is a difficult concept to describe and measure.²⁵ We all know parents who are more positive and consistent with their children than other parents who are inconsistent and make up rules as they go along. The NLSYC tried to capture the diversity of parenting styles using six different scales.* (See the research paper on parenting by Dr. Landy and Kwok Kwan Tam in this publication.) For brevity we will present the findings of only two: “positive interaction” and “consistent parenting.”

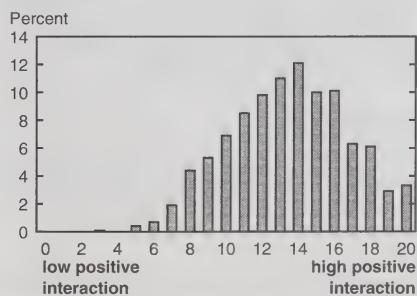
The first parenting scale measures positive interaction. One of the parents of children aged 2 to 11 years was asked several questions concerning their interaction with their children, such as: “how often do you praise your child?”, “how often do you talk or play with the child?”, and “how often do you laugh together?” As an example of how parents answered particular questions, the majority of children (52.7%) lived with parents who replied that they laughed with their child many times each day. Very few children (15.7%) lived with parents who said they never laughed with their child or did so only a few times a week.

When combined, the scores of all the questions formed the basis of a positive interaction scale, the results of which are shown in Figure 3.6. The distribution of children by parents’ scores follows a

fairly “normal” distribution grouped around a score of 14. But since the distribution shows a rightward bias, it suggests that most children were living with parents who had fairly positive interactions with their children.

Figure 3.6

Distribution of children aged 2 to 11 years by scores on the positive interaction scale, 1994–1995

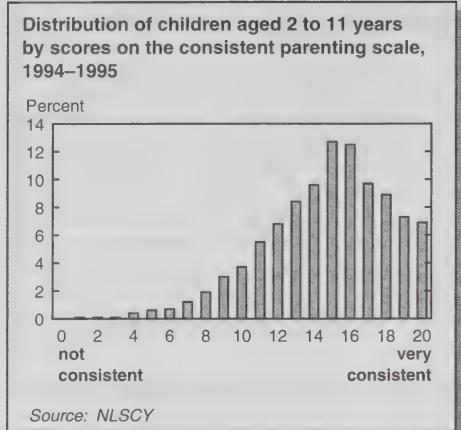


Source: NLSYC

Figure 3.7 reveals basically the same type of distribution pattern for “consistent parenting” styles: a basic “normal” distribution with a rightward bias suggests that most children were receiving consistent parenting. The scale was based on parents answering questions such as: “if you give your child a command do you make sure he or she follows it?”, “when you discipline a child does he or she ignore it?”, and “how often do you follow through and punish your child after telling him or her to stop doing something?” In response to the

* The parenting scales include positive interaction, hostile interaction, consistent parenting and aversive parenting.

Figure 3.7



last question, most children (63.9%) lived with a parent who answered “all the time” or “more than half the time.” Still, about one-third of children aged 2 to 11 years (36.1%) lived with a parent who said they followed through on punishment “half the time” or less.

These parenting scales do not provide conclusive evidence about how parents were interacting with their children, but they do highlight the importance of looking at family dynamics when considering the environment in which children grow up.

Family Functioning

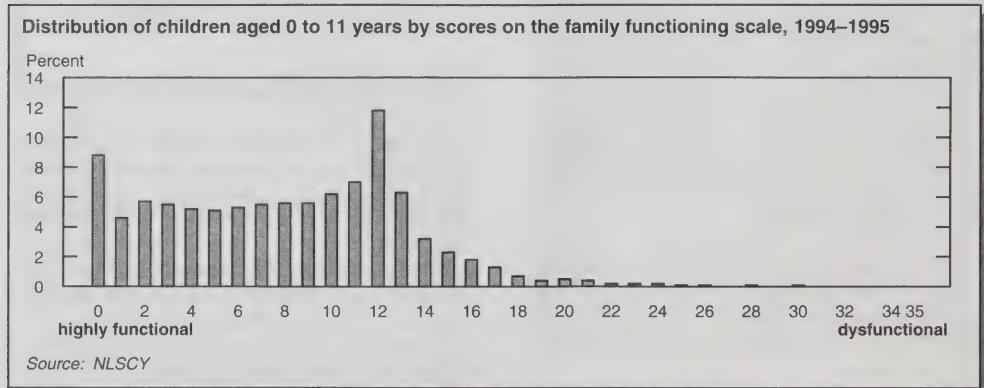
The previous two parenting scales focus attention on the specific relationship between parent and

child, while the family functioning scale looks at the health of relationships among all family members. The quality of family relationships is particularly important for the long-term development of healthy children. The Ontario Child Health Study, for example, found a significant association between family dysfunction and mental health problems among children.

The NLSCY employs the same family functioning scale used in the Ontario Child Health Study. One parent of each of the children aged 0 to 11 years was asked 12 questions focusing on six activities reflecting how well the family worked together: problem solving, communication, roles, emotional responsiveness, emotional involvement and behaviour control. Examples of specific statements parents were asked to respond to are: “we express feelings to each other”; “we don’t get along well together”; and “we feel accepted for what we are.”

Figure 3.8 shows the distribution of children on the family functioning scale based on the parents’ answers to the survey questions. The distribution is easier to interpret thanks to the work of researchers at Chedoke-McMaster Hospitals in Hamilton, who have developed a clinical cut-off or threshold of functioning. Using this cut-off, over 90% of families surveyed in the NLSCY had scores that indicated “healthy” functioning; that is, scores between 0 and 14 (out of 35). Only 8.4% had scores over 15 and as a result were classified as “dysfunctional” (defined by the researchers as having the tendency to seek clinical help).

Figure 3.8



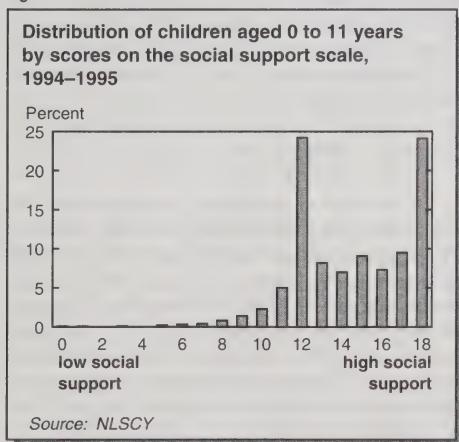
Social Support for Parents

Every family needs support from relatives, friends and neighbours to cope with the everyday stresses that come with raising children. Social support is especially important for families that are experiencing difficulties; a helping hand can often defuse problems in families before they get out of control.²⁶ In cases where there is parent-child conflict, research illustrates that having another stable, supportive adult in a child's life can be a key factor in helping prevent adverse outcomes in both the present and the future.¹³

The NLSCY asked whether parents had supportive relationships with family, friends or others. Did they have people they could trust, feel comfortable talking over problems with, or turn to for advice? For example, in response to the statement, "there are people I can count on in an emergency," 53.5% of children lived with a parent who "strongly agreed"; another 43.5% of children lived with someone who "agreed."

Figure 3.9 presents the distribution of children on the scale of social support for parents. The strong rightward bias of the distribution indicates that almost all children lived with parents who had high social support.

Figure 3.9



4. Linking Environmental Factors with Child Outcomes

As mentioned at the beginning of this research paper, good nurturing environments in childhood are necessary to long-term health and well-being. On the other hand, impoverished environments create barriers to healthy development, barriers that can have long-term negative consequences for the child and for society as a whole. Children meet the world with different assets and liabilities, whether genetic, biological or socioeconomic. The task facing families, communities and society at large is to create environments that help children confront their difficulties and develop their strengths and capabilities.

The NLSCY is collecting information on the many factors that contribute to child and youth development. Children sit at the centre of overlapping social, economic, cultural and spiritual environments. At the broadest level, society and governments set the basic environment within which families raise children. The distribution of income and the distribution of community resources are obviously two of the most important influences on the healthy development of children. It is within this environment that families must make choices — subject to their resources and other constraints — about household size and structure, consumption, work and leisure, education, and the allocation of income and time. Parents also make choices about how they care for and nurture their children. Taken together, all these factors set children on their life course, at some point during which they begin to make life decisions on their own behalf about education, fertility and employment.²⁷

The NLSCY provides an opportunity to look at the environments that are shaping the well-being and development of children in Canada and to link these environments to child outcomes. With the release of this first wave of data, we can take stock of the choices Canadian society and families have made concerning children and how these choices are affecting children now. As future cycles of the NLSCY are completed, we will be able to see the long-term consequences of the choices society and families are making today.

By way of conclusion, we will look at a few environment-outcome associations that emerge from analysis of some of the NLSCY data. It is important to remember that these associations do not prove causation between one factor and a particular outcome. Rather, they point the way to fruitful lines of research. Some of these lines of research are explored in the other research papers in this publication, but most will emerge over time as more data become available.

For our brief first look inside the “black box” of child development, we chose to examine the results of four scales: school readiness, measured by the Peabody Picture Vocabulary Test (PPVT) and the Échelle de vocabulaire en images Peabody (EVIP); motor and social development; family functioning; and parental depression. We focused on the children and families concentrated in the low end of each distribution to discern whether the different populations were marked by any common environmental factors that might indicate plausible associations.*

School Readiness

Differences in household income appeared to be associated with school readiness. Using the distribution of scores on the PPVT/EVIP, we observed that smaller proportions of children aged 4 to 5 years from lower-income households (annual household income less than \$30,000) fell in the normal range of PPVT/EVIP scores compared with children from middle-income (\$30,000 to \$60,000) and higher-income (over \$60,000) households. While 25.3% of children from lower-income families had scores indicating delayed development, only 15.6% of middle-income children and 9.2% of higher-income children did.

The NLSCY provides evidence that the relationship between parent and child—in this case we focused on the results of the positive interaction scale—is also an important factor shaping school readiness. High positive-parenting scores were associated with normal and advanced scores on the PPVT/EVIP. For example, 69.1% of children aged 4 to 5 years living with a parent who had a high positive-parenting score fell in the band of

normal development on the PPVT/EVIP scales. This compares with only 46.8%[†] of children who lived with parents who had the lowest positive-parenting scores.

Motor and Social Development

As with school readiness, positive parental interaction also appears to be associated with scores on the motor and social development scale. For example, only 13.5% of children under age 2 whose parents scored high on positive parenting showed delayed motor and social development, compared with 35.2% of children (almost three times the proportion) whose parents had low positive-parenting scores.

Family Functioning

Our initial analysis of the NLSCY data suggests that household income is an important factor in distinguishing between functional and dysfunctional families (using the scores on the Chedoke-McMaster family functioning scale). Of children living in lower-income households, 14.6% were considered dysfunctional; this compares with 7.5% of children living in middle-income households and 5.0% in higher-income households.

Not surprisingly, children living in poorly functioning families did not appear to have good relationships with other family members and their peers. Children who demonstrated problems in their relationships were more likely to live in families that were classified as dysfunctional than in families considered functional.

Parental Depression

To discern which characteristics are associated with depressive tendencies among parents, we set up cross-tabulations between the group of high-scorers on the depression scale and a list of demographic and family variables. One of the most striking associations found was with household income. Of the children in lower-income households, 17.5% lived with parents who scored high on the depression scale (that is, they had many symptoms of depression). In comparison, 8.3% of children living in middle-income households had a depressive parent and only 4.8% of children in higher-income families had a parent with depressive tendencies. In summary, children living with depressed parents were almost four times as likely to be living in lower-income households than in higher-income households.

* To determine the factors associated with poor scores on these four scales, we set a threshold such that roughly 10% of the children or parents who scored above this threshold were said to have a problem. A similar methodology is followed in the research paper by Dr. Offord and Dr. Lipman in this publication.

[†] This is a qualified estimate that is less reliable due to the high sampling variability.

Conclusion

The initial findings presented here, along with the many findings in the other research papers in this publication, should begin to shed light on which factors are the most influential inside the “black box” of child development. However, it must be cautioned that as useful as the findings from this first release are, they still represent only a snapshot for 1994–1995 — albeit the best snapshot of children and youth we have ever had.

Cross-sectional snapshots are limited to telling us which environmental conditions were associated with certain outcomes at the time of the survey. We do not know how long they were present or how long they will persist. For instance, two children of similar age may be living in two different low-income households today, but they may exhibit different outcomes (e.g., school readiness, motor and social skills). One child may have been in a low-income family for only a year, while the other may have been poor for many years. The snapshot does not reveal this — and what tomorrow will bring for either child is, as yet, unknown.

The power of the NLSCY is that it will allow us to turn this static snapshot into a “video.” To continue the example above, the NLSCY will let us follow these two children for years so we can study how low income and other influences are affecting their development. If these children escape from the adverse influences of poverty, we can examine which protective factors contributed to that escape: the type of child care, friendships, parenting, family structure and so forth. Only then will we obtain a better look inside the “black box” of child development.

Until we start accumulating this evidence from the NLSCY, there will continue to be controversy about how childhood experiences influence later life. Some researchers focus on biological and genetic conditions or discrete events — typically in a child’s early life — that produce a lasting impact. This type of approach suggests that highly targeted interventions during critical periods in a child’s development are the most effective in ensuring the long-term well-being of children. Others emphasize the cumulative effect of life events along a child’s developmental pathway. The socioeconomic status of a child’s parents, for instance, influences the relative health of their newborn, which in turn affects the child’s level of school readiness and so on.²⁸

The NLSCY will provide a vantage point from which to enter these debates. It will help us evaluate the challenges and opportunities that face children and families, and it will be a stimulus of public debate and action to ensure that all children in Canada lead happy and productive lives.

References

1. For a description of the NLSCY, see: Statistics Canada and Human Resources Development Canada. 1995. *National Longitudinal Survey of Children: Overview of Survey Instruments for 1994-95, Data Collection, Cycle 1*. Statistics Canada Catalogue no. 95-02. Ottawa: Minister of Industry.
2. Statistics Canada. 1994. *Report on the Demographic Situation in Canada, 1994*. Statistics Canada Catalogue no. 91-209E. Ottawa: Minister of Industry.
3. Statistics Canada. 1961. “Population.” In *Census of Canada, 1(2)*. Ottawa: Minister of Trade and Commerce.
- Statistics Canada. 1981. “Population: age, sex and marital status.” In *Census of Canada*. Statistics Canada Catalogue no. 92-901 (Vol. 1, National Series). Ottawa: Minister of Supply and Services.
- Statistics Canada. 1991. “Population: age, sex and marital status.” In *Census of Canada*. Statistics Canada Catalogue no. 93-310. Ottawa: Minister of Industry.
4. Statistics Canada. 1971. “Population: general characteristics.” In *Census of Canada*. Ottawa: Minister of Industry, Trade and Commerce.
5. Indian and Northern Affairs Canada. 1995. *Highlights of Aboriginal Conditions, 1991, 1986*. Vol. 3. Ottawa: Minister of Industry.
6. Lowe, C., and M. Boone. 1992. “Poverty, the future, and child health: a testable model to explain low birth weight.” Paper presented at the World Congress and Exposition of Child Health, Vancouver, B.C.

7. McCormick, M., et al. 1992. "The health and developmental status of very low birth weight children at school age." *Journal of the American Medical Association*, 267: 2204-2208.

8. Rutter, M. 1987. "Psychological resilience and protective mechanisms." *American Journal of Orthopsychiatry*, 57: 316-331.

9. Ontario Ministry of Community and Social Services. 1986. *Child Health Study, Summary of Initial Findings*. Toronto: Queen's Printer for Ontario.

10. For a discussion of the importance of positive school experiences on child development, see: Egeland, B., et al. "Resilience as a process." *Development and Psychopathology* (in press).

11. See Wyman, P. A., et al. 1993. "The role of children's future expectations in self-esteem functioning and adjustment to life stress: a prospective study of urban at-risk children." *Development and Psychopathology*, 5: 649-661.

12. See Weikart, D. P. 1989. "Early childhood education and primary prevention." *Prevention in Human Services*, 6: 285-306.

13. Werner, E., and R. Smith. 1992. *Overcoming the Odds: High Risk Children from Birth to Adulthood*. Ithaca (NY): Cornell University Press.

14. Hetherington, E. M. 1989. "Coping with family transitions: winners, losers and survivors." *Child Development*, 60: 1-14.

15. For a discussion of Canadian families, see the following:

Baker, M. 1993. *Families in Canadian Society*. 2nd ed. Toronto: McGraw-Hill Ryerson.

Eichler, M. 1988. *Families in Canada Today: Recent Changes and Their Policy Consequences*. 2nd ed. Toronto: Gage.

Mandell, N., and A. Duffy (editors). 1988. *Reconstructing the Canadian Family: Feminist Perspectives*. Toronto: Butterworths.

Vanier Institute of the Family. 1994. *Profiling Canada's Families*. Ottawa: Vanier Institute of the Family.

Parr, J. 1990. *The Gender of Breadwinners: Women, Men and Change in Two Industrial Towns, 1880-1950*. Toronto: University of Toronto Press.

Coontz, S. 1992. *The Way We Never Were: American Families and the Nostalgia Trap*. New York: Basic Books.

16. Marcil-Gratton, N. 1993. "Growing up with a single parent: a transitional experience? Some demographic measurements." *Single Parent Families*. Edited by J. Hudson and B. Galaway. Toronto: Thompson Educational Publishing.

17. Statistics Canada. 1992. *Single-parent Families in Canada*. Statistics Canada Catalogue no. 89-522E. Ottawa: Minister of Industry.

18. Statistics Canada, 1992. *Births, 1992*. Statistics Canada Catalogue no. 84-210. Ottawa: Minister of Industry.

19. See the following:

Bronfenbrenner, U. 1979. *The Ecology of Human Development*. Cambridge (MASS): Harvard University Press.

Elder, G., J. Modell and R. Parke. 1993. *Children in Time and Place*. Cambridge: Cambridge University Press.

Haveman, R., and B. Wolfe. 1994. *Succeeding Generations: On the Effects of Investments in Children*. New York: Russell Sage Foundation.

Hertzman, C. 1994. "The lifelong impact of childhood experiences: a population health perspective." *Daedalus*, 123.

Rutter, M. 1989. "Pathways from childhood to adult life." *Journal of Child Psychology and Psychiatry*, 30.

Sameroff, A. 1983. "Developmental systems: contexts and evolution." In *Carmichael's Handbook of Child Psychology*. Edited by P. H. Mussen. Vol. 4. *History, Theory and*

Methods. Edited by W. Kessen. New York: Wiley.

Scarr, S. 1992. "Developmental theories and individual differences." *Child Development*, 63.

20. See: Ross, D., K. Scott and M. Kelly. 1996. *Child Poverty: What Are the Consequences?* Ottawa: Canadian Council on Social Development.

21. Employment for women with children under 3 years rose from 39% in 1981 to 57% in 1994. Among women with a child between the ages of 3 and 5 years, the employment rate increased from 47% in 1981 to 59% in 1994. See: Statistics Canada. 1995. *Women in Canada: A Statistical Profile*. 3rd ed. Ottawa: Minister of Industry.

22. The higher the level of education, the lower the likelihood of having a low income. In 1992, for example, the poverty rate among working-age adults who did not graduate from high school was 23%, compared to 10% for those with a Bachelor's degree and 7% for those with a degree above the Bachelor's level. See: Lochhead, C. 1995. "Educated but poor." *Insight*, 2: 2.

23. See the following:

Haveman, R., and B. Wolfe. 1995. "The determinants of children's attainments: a review of methods and findings." *Journal of Economic Literature*, 33: 1855–1857.

Spencer, M. B., et al. 1993. "Self-efficacy among urban African American early adolescents: exploring the issues of risk, vulnerability and resilience." *Development and Psychopathology*, 5: 719–739.

24. See the following:

Conrad, M., and C. Hammen. 1993. "Protective and resource factors in high and low risk children: a comparison of children with unipolar, bipolar, medically ill and normal mothers." *Development and Psychopathology*, 5: 593–607.

Ladewig, B. H., P. O. Jessee and M. P. Strickland. "Children held hostage: mother's depressive affect and perceptions of family psychosocial functioning." *Journal of Family Issues*, 13: 65–80.

25. See Baldwin, A. L., C. Baldwin and R. E. Cole. 1990. "Stress-resistant families and stress-resistant children." In *Risk and Protective Factors in the Development of Psychopathology*. Edited by J. Rolf, A. Master, D. Cicchetti et al. Cambridge: Cambridge University Press.

26. See Wyman, P. A., et al. 1991. "Developmental and family milieu correlates of resilience in urban children who have experienced major life stresses." *American Journal of Community Psychology*, 19: 405–426.

27. Haveman and Wolfe develop this perspective on child development. See Haveman, R., and B. Wolfe. 1995. "The determinants of children's attainments: a review of methods and findings." *Journal of Economic Literature*, 33: 1829–1878.

28. See Hertzman, C. 1994. *Child Development and Long-Term Outcomes: A Population Health Perspective and Summary of Successful Interventions*. CIAR Programs in Human Development and Population Health, Working Paper no. 1, March.

Starting Out

Lynn McIntyre

This research paper examines the health of infants and toddlers, from newborns to 3-year-olds. It looks at conditions that contribute to a healthy pregnancy and to children's health around the time of birth. It also examines factors in the family environment that influence a newborn's health. The National Longitudinal Survey of Children and Youth (NLSCY) is valuable in that it has gathered information to increase our understanding of the relationships, if any, among mother's health and well-being, family environment, and the health and development of the infant and toddler.

Healthy Child Development

Early childhood is a time of growth and development in the brain and nervous system and in the acquisition of language and motor and social skills. We know that growth and development are very important during the first three years of life if children are to reach their full potential.¹ Thus, the goal in early childhood is healthy child development, which depends on health status during the mother's pregnancy, around the time of birth, and during the first few years after birth.

Many factors have been identified that affect the developing fetus and the eventual health and development of the growing infant and child. These factors are usually thought of as biological (related to the fetus' genetic make-up) or environmental (related to external influences on the fetus, including conditions in the womb). The relative importance of these biological and environmental factors is unclear. While newborns have a complete genetic structure, environmental factors can interfere with children's ability to reach their potential.² This research paper focuses mostly on environmental

factors that affect a young child's health because, unlike genetics, these factors can be changed.

The profound effect of poverty on young children's health can be studied indirectly using data from Cycle 1 of the NLSCY. There is substantial evidence that children living in poverty suffer from poor health and are less successful in their schoolwork than other children.³⁻⁵

Children of the NLSCY

This analysis of NLSCY data uses a sub-sample of 8,605 children aged from 0 years (newborn) to 3 years who were born between 1991 and 1995. The sample, which does not include children who were living in the Yukon and Northwest Territories or in institutions, represents the 371,000 children in Canada who were aged 0 to 11 months; the 382,000 children aged 1 year (up to 23 months); the 407,000 children aged 2 years (up to 35 months); and the 385,000 children aged 3 years (up to 47 months). Some of the results also apply to children aged 3 to 4 years who were siblings of survey children whose age groups were specifically selected for study. Information on the children was collected from the person most knowledgeable about the child (PMK), who was the biological mother in 89.9% of all NLSCY interviews.

Who are the 0- to 3-year-olds in Canada?

The NLSCY data from 1994–1995 give us a snapshot of children in Canada during their first three years of life. In the survey sample, 51.2% of the children were boys, consistent with the fact that there are slightly more boys born than girls. Of the

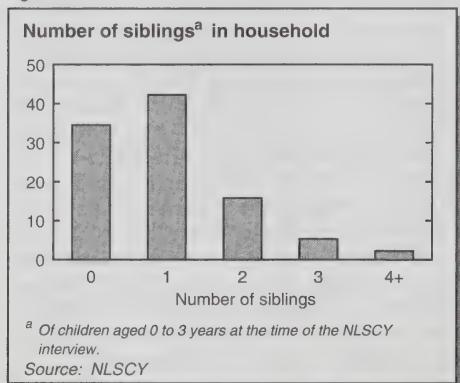
children covered in the survey, 97.9% were singleton births; 2.0% were twins; and 0.1% were triplets or greater.

In terms of household structure, 83.6% of these young children lived with both biological parents; 14.5% lived with one biological parent only; and 0.9%^M lived in a two-parent household in which only one parent was biologically related to the child. The household income distribution of families with young children placed most of them in the lower to lower-middle income brackets: 25.9% of children aged 0 to 3 years lived in a household whose combined income was \$25,000 or less; 48.0% were in households with \$40,000 or less; and 75.2% were in households with less than \$64,000.

These children represented the diversity of Canadian society: 9.4% came from a visible minority group, the largest of which in this survey was Aboriginal children (Inuit, North American Indian, and Métis at 4.4%); this was followed by Chinese (2.8%), African-Canadian (1.3%), and South Asian (0.9%^M).

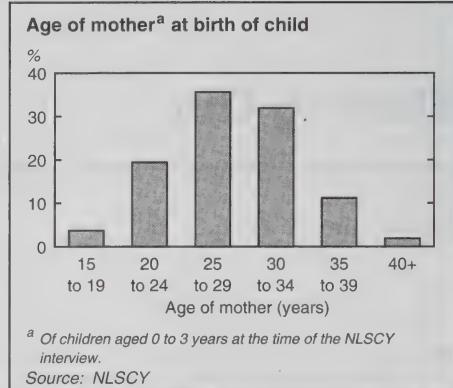
About one-third of the children were the only child in their home (to date). Figure 1 shows the number of siblings living in the same household as these children at the time of the survey.

Figure 1



The median age of the children's mothers was 29 years.* It is interesting that the children were three times more likely to be born to a mother aged 35 to 39 years than to a mother aged 15 to 19 years. Figure 2 shows the distribution of children by age of mother at the time of birth.

Figure 2



Now that we know who the NLSCY children aged 0 to 3 years are, we can examine the factors that may have contributed to their health.

Determinants of a Healthy Pregnancy

The fetus' prenatal health is related to the mother's health and health behaviours, her life circumstances, and the care she receives. Common factors in pregnancy that are associated with a baby's health include smoking,^{6,7} alcohol^{8,9} and drug use,^{8,9} mother's health¹⁰ and access to prenatal care.⁷ Other factors related to prenatal health include income,^{11,12} education,^{7,8} occupation of the mother (and sometimes of the father) and housing. In this presentation of the NLSCY results, it is important to note that people might be reluctant to report that they have acted in an unhealthy manner.

Smoking

Smoking during pregnancy has been extensively researched. There is overwhelming evidence that it leads to higher rates of low birth weight, stillbirth, prematurity and breathing problems at birth.⁶ Specifically, women who smoked during pregnancy were more likely to have a low birth weight baby than those who didn't (7.8% compared with 5.2%^M), the consequences of which will be discussed below.

^M Estimate less reliable due to high sampling variability.

* Only biological mothers were included in the calculation of mother's age at the birth of the child.

In this sub-sample of NLSCY children, 23.6% of infants aged 0 to 1 year had a mother who smoked while pregnant. Most mothers who smoked did so throughout the pregnancy (mothers of 84.1% of these children).

Alcohol

It appears that no amount of alcohol can be safely consumed during pregnancy. It is impossible to define a safe level of intake, particularly around the time of conception and during the first trimester, when the risk of birth defect is greatest.¹³ One serious problem that can occur if a woman abuses alcohol while pregnant is fetal alcohol syndrome (FAS). FAS can include birth defects and can lead to learning and development problems in children. Other problems associated with alcohol use during pregnancy include low birth weight, spontaneous abortion, death of the infant around the time of birth, and alcohol withdrawal in the newborn.¹³

The NLSCY asked mothers about alcohol consumption during pregnancy: the mothers of 82.6% of children aged 0 to 1 year reported that they did not drink at all during pregnancy; 7.1% drank throughout the pregnancy; and 2.8% drank only during the first trimester.

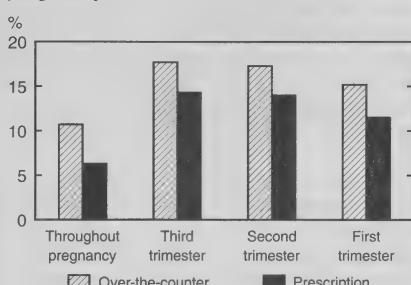
Drug Use

The NLSCY asked about the use of over-the-counter drugs, such as cold remedies, and during what stage of the pregnancy the drugs were consumed. The survey also asked about consumption of prescription drugs and when they were consumed. Unfortunately, the NLSCY did not gather particular information about which specific drugs were taken or why. Generally, drug use carries the most risks in the first trimester of pregnancy, when it can affect fetal development. The NLSCY did not ask about use of illegal drugs such as cocaine or marijuana.

Figure 3 shows the pattern of over-the-counter and prescription drug use during pregnancy: 73.0% of children aged 0 to 1 year had a mother who reported taking no over-the-counter drugs during pregnancy; and 74.8% had a mother who consumed no prescription drugs at any time during pregnancy. This means that about one-quarter of these children were exposed to some drugs during their mother's pregnancy. The effects of this are uncertain at this time.

Figure 3

Frequency of mothers'^a use of over-the-counter and prescription drugs during pregnancy^b



^a Of children aged 0 to 1 year at the time of the NLSCY interview.

^b Some respondents replied "yes" to more than one category. Overall, about one-quarter of children had a mother who made use of prescription or over-the-counter drugs at some point during her pregnancy.

Source: NLSCY

Mother's Prenatal Health and Care

The mother's health during pregnancy was also asked about: the mothers of 6.5% of children aged 0 to 1 year suffered from diabetes; 10.0% had high blood pressure; and 18.3% reported some other physical health problem.

Prenatal care is universally available in Canada, and the mothers of 97.5% of children aged 0 to 1 year received prenatal care, usually from a doctor (92.4%), nurse (2.9%) or midwife (1.4%).

The foregoing shows that the NLSCY children experienced a generally healthy prenatal environment. The exception was smoking by the mother during pregnancy, which affected about one in four children aged 0 to 1 year.

What are the Birth Outcomes of the NLSCY Children?

The majority of babies were born healthy. However, some problems during pregnancy can cause the baby to have a low birth weight. Babies born at 2,500 grams (5.5 pounds) or more are of normal birth weight; those who weigh between 1,500 and

^M Estimate less reliable due to high sampling variability.

2,499 g at birth are of low birth weight; and those who weigh between 500 and 1,500 g at birth are of very low birth weight (few babies who weigh as little as 500 g actually survive). Low birth weight infants can be small even though their mother's pregnancy was of typical duration, in which case they are called "small for gestational age." Low birth weight infants born before 36 weeks' gestation are called premature and their birth weight, though low, is appropriate for the duration of the pregnancy.

Low birth weight can have a staggering impact on a baby's health. Research has shown that infants and children born with a low birth weight are at risk for developmental delays and may face physical limitations and psychosocial problems.^{5,12,14} Documented long-term problems from conditions that lead to low birth weight include:

- learning problems⁷ such as intellectual deficits,^{8,15} reading disabilities,^{8,16} poor concentration¹⁴⁻¹⁶ and poor school performance¹⁴⁻¹⁷;
- behavioural and social problems such as hyperactive behaviour,^{15,16} impaired personal/social development^{8,15} and conduct disorders¹⁷;
- physical and health problems such as poor eye-hand co-ordination,^{14,15} hearing and speech problems,⁷ poor overall health,^{9,14} problems in physical growth^{9,14} and motor problems.^{8,18}

Fortunately, several studies have found that when there is no severe disability, the majority of these infants are able to "catch up" to other healthy children if their parents provide appropriate supports that enhance the child's environment.^{2,15}

According to the NLSCY, almost 6.0% of the children in Canada born between 1991 and 1995 were of low or very low birth weight: 4.9% of children aged 0 to 3 years were born with a low birth weight; and a further 0.8%^M were born with a very low birth weight. The survey did not ask directly about prematurity. Instead, mothers were asked if their babies were born before, after or on their due date. According to their mothers, 9.7% of children aged 0 to 3 years were born early; 1.2% were born late (usually within two weeks of the due date); and 89.0% were born during the normal time period.

^M Estimate less reliable due to high sampling variability.

^U Estimate does not meet Statistics Canada's quality standards.
Conclusions based on these data will be unreliable and, most likely, invalid.

Delivery

The birth process is usually safe for both mother and baby in Canada. Birth can occur vaginally (sometimes with the assistance of forceps or other aids) or by Caesarean section. Complications at birth, whether in the mother or the baby, are usually effectively managed in the health system.

Caesarean section was used in 18.0% of births of children aged 11 months or less at the time of the survey, while 12.4% of vaginal births for this age group required the use of devices such as forceps (6.9%) or suction (5.5%).

Newborn Health

According to their mothers, 68.8% of children aged 0 to 1 year were in excellent health immediately after birth; 19.4% were in very good health; 7.3% were in good health; and 4.5% were in either fair or poor health. Mothers were also asked about their newborns' health care needs, and 17.6% of those aged 0 to 1 year at the time of the survey had needed special medical care after birth. This included intensive care (6.0%), oxygen support with a ventilator (5.3%) and transfer to another hospital (1.2%^M). This care lasted for one day or less for 38.4%^U of these children; three days or less for 61.8%^M; and one week or less for 81.9%.^M Of those who required special care, 8.6%^U required that care for more than two weeks (15 days or more).

Mother's Post-partum Health

The majority of mothers were well after delivering their child. Post-partum (or after delivery) complications in the mother are described in Figure 4. The most common physical complications were haemorrhage (in the mothers of 6.6% of children aged 11 months or less) and infection (5.2%). Post-partum depression (not including "the blues" of the first week after birth) occurred in the mothers of 12.1% of these children, lasting 15 days or less for the mothers of 15.6%^M of them and more than a month for 4.3%.^U

In terms of pregnancy outcomes, the NLSCY shows that the majority of babies were born healthy and that their mothers experienced relatively few health problems after delivery. However, for a small percentage of babies (about 6%), a healthy start was hampered by low birth weight.

Figure 4

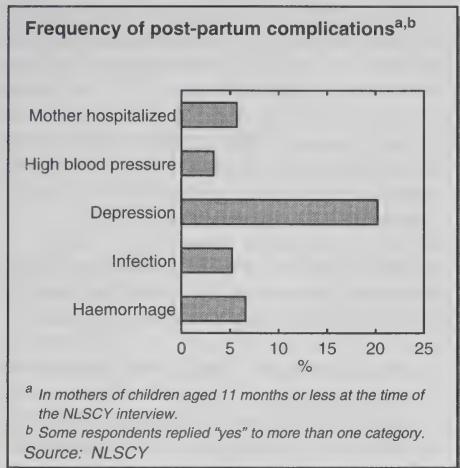
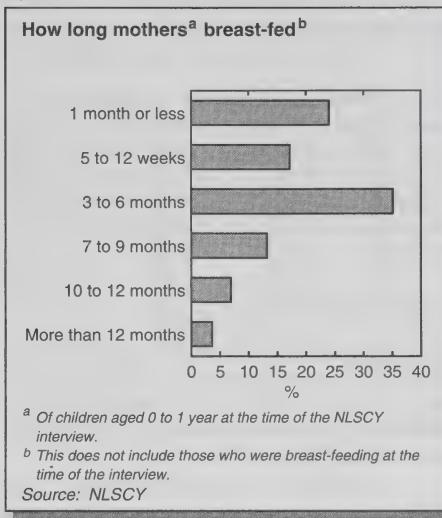


Figure 5



Protective Factors in Early Years

The NLSCY lets us study two important factors that can enhance children's healthy development — regardless of their health after birth — within their family: breast-feeding and social support.

Breast-feeding

There are numerous benefits from breast-feeding, including improved bonding between mother and child and better development of social behaviours. Breast-feeding is a strong protector of babies against infectious diseases.¹⁹ It also contributes to healthy brain and nervous system development because of the fats contained in breast milk.²⁰

Breast-feeding adoption was quite high in the mothers of NLSCY children aged less than 2 years: 55.9% of these infants had been breast-fed for at least some time; and 19.4% were being breast-fed at the time of the survey. The duration of breast-feeding for the NLSCY infants and toddlers is shown in Figure 5. In total, 75.3% of children under 2 years old had been breast-fed for at least a short time or were being breast-fed at the time of the survey.

Table 1 lists the reasons reported by mothers for stopping breast-feeding; they usually stopped because of lack of milk and returning to work. Cessation was rarely the result of their partner wanting them to stop or because their doctor advised them to do so.

Social Support

The NLSCY does not provide direct information about a mother's real or perceived stress. However, it did include a social support scale. A parent's social support system can make child-rearing easier. It is encouraging that the PMK of the vast majority of NLSCY children felt well supported. For example, the PMKs of 92.9% of children aged 0 to 3 years said they had family and friends who helped them feel safe, secure and happy. As well, the PMKs of 96.7% of these children said they had people they could count on in an emergency.

Table 1. Reasons for breast-feeding cessation^a

Reason for breast-feeding cessation ^b	Percent %
Not enough milk	26.7
Returned to work	17.5
Planned to stop	15.7
Baby weaned self	12.4
Inconvenience	12.3
Other	10.5
Sore nipples	6.8
Difficulty	5.6
Mother's illness	3.7 ^m
Formula preferred	2.0 ^m
Doctor told to stop	2.0 ^m
Partner wanted to stop	0.3 ^m
Wanted to drink alcohol	0.1 ^m

^a By mothers of children aged 0 to 1 year at the time of the NLSCY interview.

^b Some respondents replied "yes" to more than one category.

^m Estimate less reliable due to high sampling variability.

Source: NLSCY

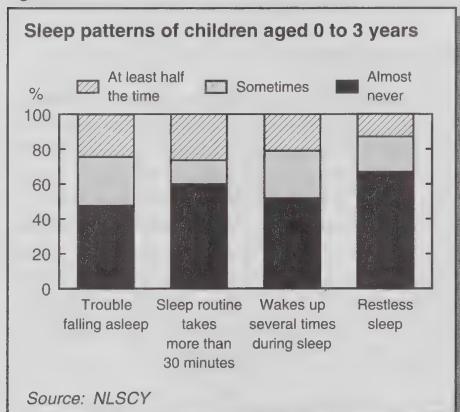
Child Development in the First 3 Years

The NLSCY lets us describe various developmental characteristics of children during their first 3 years of life. This includes their sleep and feeding behaviours and their early social and emotional development. Many of these behaviours are used to describe an infant and toddler as "easy" or "difficult."

Sleep and Feeding

Figure 6 presents sleep problems reported for children aged 0 to 3 years. Almost one-quarter of these children had trouble falling asleep at least half the time; one out of five had trouble staying asleep at least half the time.

Figure 6



Feeding problems seemed to occur more frequently after the second year of life. Of children in the first year of life, 7.8% were difficult to feed at least half the time. Of children aged 1 to 2 years, 7.7% were difficult to feed; of those aged 2 to 3 years, 13.7% were; and of those aged 3 to 4 years, 17.6% were. In the overall age group of children aged 1 to 3 years, 33.6% had no problems being fed, 53.4% got used to new foods and 13.0% refused new foods.

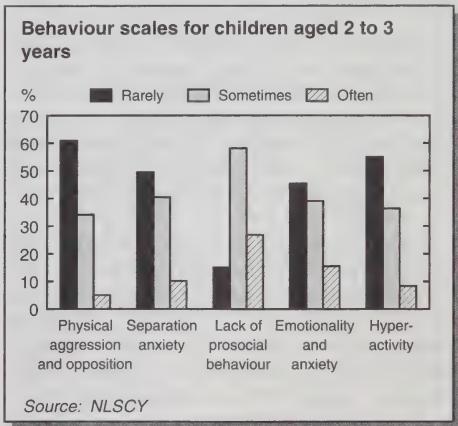
Social and Emotional Behaviours

The PMK was asked about the behaviours of children aged 2 to 3 years. Behaviour categories included:

- hyperactivity/inattention: illustrated by behaviours such as listlessness, being unable to concentrate, giving up easily, staring into space or being unable to settle to anything for more than a few moments;
- prosocial behaviours: illustrated by actions such as comforting a child who is crying or upset, trying to help someone who has been hurt or offering to help other children do things;
- emotional disorder/anxiety: described as crying a great deal, appearing unhappy, sad or depressed, or being high-strung or tense;
- physical aggression and opposition: illustrated by behaviours such as defiance, temper tantrums, kicking, biting or hitting other children, or appearing to feel no guilt over misbehaving;
- separation anxiety: demonstrated by clinging to an adult, being too dependent, constantly seeking help or not wanting to sleep alone.

Children's behaviours in these categories are shown in Figure 7.[†] It appears that between 5.0% and 26.8% of children aged 2 to 3 years often exhibited one of the problem behaviours explored.

Figure 7



[†] The behavioural scales used in the NLSCY for children's behaviours were prepared by Statistics Canada. The thresholds for the categories — rarely, partly and often — were derived by the author using scores of 0 to 4 (rarely), 5 to 8 (partly), and 9+ (often) for hyperactivity; 0 to 3, 4 to 8, and 9+ for prosocial behaviour (graphed in reverse); 0, 1 to 2, and 3+ for emotionality and anxiety; 0 to 5, 6 to 10, and 11+ for physical aggression and opposition; and 0 to 2, 3 to 5, and 6+ for separation anxiety.

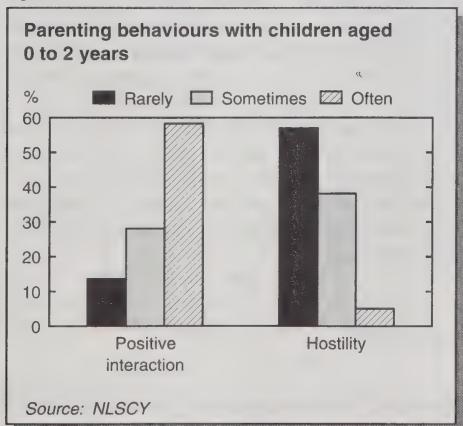
Supportive Parents

Nothing demands more commitment and flexibility in a wider range of physical and emotional capacities than does parenting. Today's parents often have to balance work with their daily domestic activities. The positive reinforcement parents give their children will influence their success in later years.

The survey elicited information from PMKs about their parenting behaviours. For children aged 0 to 23 months, parenting behaviour was described as either positive interaction (praise, playing together, laughing together) or hostility (parent annoyed with child, telling child he/she is bad or not as good as others). For children aged 2 to 3 years, parenting was broken down into positive interaction, hostility, consistency (disciplining the same way for the same behaviours each time) and aversive parenting (raised voice, taking away privileges, using physical punishment).

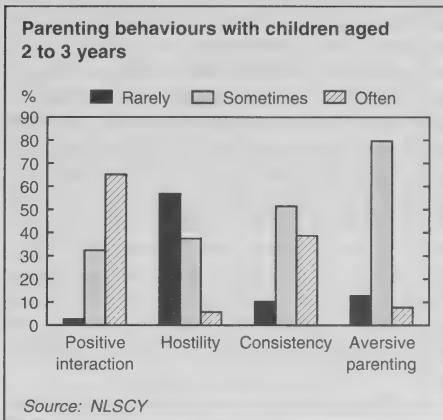
Figures 8 and 9[‡] present the frequency of these parenting behaviours for the appropriate age groups. For children in their first 2 years of life, parents seem to have reported more negative interactions than in later years.

Figure 8



[‡] The behavioural scales used in the NLSCY for parenting behaviours were prepared by Statistics Canada. The thresholds for the categories — rarely, partly and often — were derived by the author using scores of less than 15 (rarely), 15 to 17 (partly) and 18 to 20 (often) for positive interaction; 0 to 1, 2 to 4, and 5+ for hostility in the youngest children; less than 10, 10 to 15, and 16+ for hostility and consistency in the older age group; 0 to 10, 11 to 15, and 16 to 20 for positive interaction in the older age group; and 0 to 2, 3 to 8, and 9 to 16 for aversive parenting.

Figure 9



Key Determinants of Healthy Child Development

The NLSCY lets us examine some of the relationships among the mother's health behaviours and life circumstances, the birth process, and the health and development of the infant and toddler. This section presents simple associations between some of these factors and children's health outcomes. These associations are meaningful in terms of the statistical tests used,[§] but they do not use more complex analyses that control for factors indirectly related to the association. For example, low birth weight infants were more likely to have mothers who had high blood pressure during pregnancy. They were also more likely to have low birth weight if their mother took a prescription medication while pregnant. However, having high blood pressure and taking medication could be related, such that looking for a simple relationship could mislead the reader about the underlying cause. To understand the causes of poor outcomes, we must perform more in-depth analyses of the NLSCY data to calculate the real risk or odds of a health condition contributing to a health outcome.

Looking at some simple relationships with respect to low birth weight, the NLSCY revealed that its occurrence was higher in female (6.3%) than in male (5.1%) babies. As well, the occurrence of low birth weight was 7.8% among children whose mothers smoke compared with 5.2% among

[§] The chi-square was used for all statistical tests.

children whose mothers were non-smokers. As mentioned earlier, 11.6% of babies whose mother had high blood pressure had low birth weight; this compares with 5.2% of those whose mother did not. Of babies whose mother took prescription medication while pregnant, 8.6% had low birth weight; this compares with 4.9% of children whose mother did not. There may be a link between the previous two factors and the fact that low birth weight occurred in 9.8% of babies whose mothers had another physical health problem during pregnancy; this compares with 4.9% of children whose mother did not. Since low birth weight could be caused by prematurity, it is not surprising that 41.5% of premature babies had low birth weight.

A mother's age or membership in a visible minority group did not seem to contribute significantly to low birth weight. There also appeared to be no significant contribution from pregnancy diabetes or the use of over-the-counter drugs or alcohol; however, with so few mothers of NLSCY children reporting having consumed alcohol or having suffered pregnancy diabetes, comparisons are difficult.

The birth outcome of Caesarean section was also examined for any relationships to prenatal conditions and complications following birth: 31.4% of premature infants were delivered by Caesarean section, compared with 16.7% of full-term infants. Of children whose mother had high blood pressure, 26.2% were born by Caesarean section compared with 17.4% of those whose mother did not.

It is noteworthy that post-partum depression was higher among women who had a Caesarean section (the mothers of 26.3% of children) compared with those who did not (18.8%). Special medical care after birth was required by 21.5% of babies delivered by Caesarean, compared with 15.9% of those delivered vaginally.

There was no relationship between Caesarean section and mother's age at the time of the child's birth, her family structure or the child's gender. Caesarean section did not interfere with breast-feeding adoption when compared with vaginal delivery. But the presence of low birth weight seemed to cause more deliveries by Caesarean than did a normal weight (25.9% of children compared with 17.8%).

The NLSCY also allows an examination of the relationship between various outcomes and the use of birthing aids, specifically forceps or suction, in a vaginal delivery. While a birthing aid was used in only 15.2% of vaginal births, 62.6% of these interventions were required for male babies. Special medical care after birth was significantly higher for children delivered using a birthing aid (24.4%) than for those who had an unassisted vaginal birth (14.3%). Mothers were more likely to suffer post-partum depression after assisted delivery (present in the mothers of 29.6% of children) than after spontaneous vaginal delivery involving no birthing aid (16.8%).

Three questions about infant and toddler sleep behaviours were most useful in searching for relationships among factors associated with sleep problems (trouble falling asleep, child wakes up several times a night and sleep is restless). In general, infants with sleep problems had mothers with lower social support. They were also exposed to parenting practices that scored high on the hostility scales.

There were few associations between feeding problems and parenting style during the first year of a child's life. More hostile parenting styles and negative parenting styles were both significantly related to difficulty in feeding children aged 0 to 3 years. For children aged 1 to 3 years, being a male child or the child's older age (regardless of gender) were the factors most related to feeding problems.

Relationships among children's emotional and social development, factors in their environment and factors related to their health at birth are beyond the scope of this paper, but these relationships could be identified through more complex analyses of NLSCY data.

Summary

The NLSCY demonstrates that children in Canada generally had a healthy start in terms of access to prenatal care, their mother's health, the health conditions surrounding their birth and limited exposure to drugs and alcohol during pregnancy. However, too many mothers continued to smoke while pregnant. As well, about 6% of children began

life with low birth weight, which has potential consequences for their health and development. We must think about ways to help pregnant women give up smoking early in their pregnancy. We also must continue to work with mothers who are more likely to have babies with low birth weight. For their babies to be as healthy as possible, these mothers may need income assistance, social support, assistance to reduce tobacco, alcohol or drug use, better housing and nutritional supplements. Glimpses into the effects of poor parenting styles on such behaviours as sleeping and feeding make us consider how we can better prepare parents for the difficult job of caring for an infant or toddler.

The NLSCY identified how frequently post-partum depression occurred, although it was usually of short duration. We must learn more about how to support depressed mothers with small babies at home. The survey also points to the possible association of Caesarean section or the use of birthing aids with post-partum depression. These findings should be examined to see if they are borne out by more sophisticated analyses of the NLSCY data or by information from other studies.

Three-quarters of babies were breast-fed at some time, although only 35.1% of them were breast-fed for three to six months. Pressures such as returning to work and concerns about insufficient milk contributed to the cessation of breast-feeding. We must continue to support baby-friendly hospitals, public places and workplaces so mothers feel they and their breast-fed babies are welcome.

The NLSCY will be following the young children described in this paper over time, which will let us learn how they develop over the long term. We will also learn more about how a healthy start contributes to children's long-term success and how the effects of an unhealthy start can be modified during the early childhood years.

References

1. Federal, Provincial and Territorial Advisory Committee on Population Health. 1994. *Strategies for Population Health. Investing in the Health of Canadians*. Ottawa: Minister of Supply and Services Canada, pp 23–25.
2. Lipsitt, L. P. 1979. "Learning assessments and interventions for the infant born at risk." In *Infants Born at Risk: Behaviour and Development*. Edited by T. M. Field, A. M. Sostek, S. Goldberg, and H. H. Shuman. New York: SP Medical and Scientific Books.
3. Shah, C., M. Kahan and J. Krauser. 1987. "The health of children of low-income families." *Canadian Medical Association Journal*, 137: 485–490.
4. Maxwell, C., and S. Simkins. 1985. Background paper on nutrition for the disadvantaged. Report prepared for Health Promotion Directorate, Health Services and Promotion Branch, Health and Welfare Canada.
5. Canadian Institute of Child Health. 1994. *The Health of Canada's Children: A CICH Profile*. 2nd ed. Ottawa: Canadian Institute of Child Health, pp 113–129.
6. Peacock, J. L., J. M. Bland and H. R. Anderson. 1995. "Preterm delivery: effects of socio-economic factors, psychological stress, smoking, alcohol, and caffeine." *British Medical Journal*, 311: 531–535.
7. Edwards, C. H., et al. 1994. "Demographic profile, methodology, and biochemical correlates during the course of pregnancy." *Journal of Nutrition*, 124: 917S–926S.
8. Brooks-Gunn, J., C. McCarton and T. Hawley. 1994. "Effects of in utero drug exposure on children's development." *Archives of Pediatric and Adolescent Medicine*, 148: 33–39.
9. Nair, P., S. Rothblum and R. Hebel. 1994. "Neonatal outcome in infants with evidence of fetal exposure to opiates, cocaine and cannabinoids." *Clinical Pediatrics*, May: 280–285.
10. Biran, G., et al. 1994. "Premature delivery of small versus appropriate-for-gestational-age neonates. A comparative study of maternal characteristics." *Journal of Reproductive Medicine*, 39: 39–43.
11. The Canadian Institute of Child Health. 1993. *Prevention of Low Birthweight in Canada: Literature Review and Strategies*. Prepared for the Health Promotion Branch, Ontario Ministry of Health.

12. Cusson, R. M. and A. L. Lee. 1994. "Parental interventions and the development of the preterm infant." *Journal of Obstetric, Gynecological and Neonatal Nursing*, 23: 60–68.
13. Rankin, J. G. and M. J. Ashley. 1992. "Alcohol-related health problems." In *Maxcy-Rosenau-Last Public Health and Preventive Medicine*. Edited by J. M. Last and R. B. Wallace. 13th ed. Norwalk (CN): Appleton and Lange.
14. Saigal, S., et al. 1994. "Comprehensive assessment of the health status of extremely low birth weight children at eight years of age: comparison with a reference group." *Journal of Pediatrics*, 125: 411–417.
15. Caputo, D. V., K. M. Goldstein, H. B. Taub. 1979. "The development of prematurely born children through middle childhood." In *Infants Born at Risk: Behaviour and Development*, 219–247.
16. Hille, E. T. M., et al. 1994. "School performance at nine years of age in very premature and very low birth weight infants: perinatal risk factors and predictors at five years of age." *Journal of Pediatrics*, 125: 426–434.
17. Yogman, M. W., D. Kindlon and F. Earls. 1995. "Father involvement and cognitive/behavioural outcomes of preterm infants." *Journal of the American Academy of Child and Adolescent Psychiatry*, 34: 58–66.
18. Thadani, P. V. 1995. "Biological mechanisms and perinatal exposures to abused drugs." *Synapse*, 19: 228–232.
19. Hanson, L.A., et al. 1985. "Breastfeeding as protection against gastroenteritis and other infections." *Acta Paediatrica Scandinavia*, 74: 641–642.
20. Lanting, C. I., et al. 1994. "Neurological differences between 9-year-old children fed breast-milk or formula-milk as babies." *Lancet*, 334: 1319–1322.

In the Beginning: Looking for the Roots of Babies' Difficult Temperament

Claude L. Normand, Mark Zoccolillo, Richard E. Tremblay, Lynn McIntyre, Bernard Boulerice, Pierre McDuff, Daniel Pérusse and Ronald G. Barr

Parents have long noticed differences between their babies and between babies from different families. Although we would all like to believe that by providing the best and most appropriate care to our babies we have the power to create happy children who will grow up to be successful adults, we soon realize — sometimes within hours of a baby's birth — that newborns bring a personality of their own into the world. While some smile and coo, others are fussy and irritable; some babies are easy to care for and others are difficult. These early characteristics have been labelled "temperament."¹⁻⁴

Parents dealing with a difficult baby are usually concerned about their infant's irritability and demands for attention. For example, the baby may spend many hours crying at night and seem to be impossible to soothe. Parents will consult their family physician or pediatrician to discover the cause of their baby's difficult temperament. They wonder, "Why is my baby this way? What can be done about it? How is my child going to be when she grows up?"

A difficult temperament is commonly understood to have underlying physical causes. Thus, when a mother consults her pediatrician with complaints about her baby being cranky and fussy, the pediatrician may look for medical factors such as birth complications, ear infection, colic, or teething. But there is more to temperament than mere physical discomfort.

Differences in temperament have long been the object of discussion and study in philosophy and psychology. Ancient Greek and Roman philosophers described individual "qualities" which

today would be considered temperament. The Greek physician Galen classified temperament into four types: melancholic, phlegmatic, sanguine and choleric. Like our modern view of temperament, these types were believed to be biologically based and lifelong.

Although there continues to be some debate as to what constitutes temperament and whether it is the foundation of later personality, researchers agree that temperament constitutes a collection of traits, not a single characteristic. They also agree that differences in temperament appear soon after birth and do not change much over time.^{1,5} Because of the stability as well as the early presence of individual differences, it has been suggested that temperament is partly inherited.⁵⁻⁸ However, more studies are needed to distinguish genetic effects from those possibly generated by very early experiences, including those that may take place in the womb.

The family environment in which babies grow up also affects how their temperament is expressed.^{1,9-11} The way children react to their surroundings, especially their parents' behaviours, may in turn influence their environment. It is easy to imagine, for example, that difficult babies who are hard to soothe may elicit less warmth on the part of their parents than easily quieted babies do.

A parent's perception of "difficult temperament" may also be more a reflection of the parent than of the child.¹² A young, inexperienced mother suffering from postnatal depression may perceive her infant to be more difficult than might a more experienced and happier mother. In this case, a mother who complains to her pediatrician about her difficult child

might benefit more from an assessment of her own resources and mental health than from an assessment of her baby's physical health.

Previous research suggests that difficult temperament in infancy may predict later psychological problems such as excessive crying, sleep difficulties, anxiety, hostility, hyperactivity, poor school adjustment, accidents, conduct disorders and night waking.^{2,9-11,13,14} However, these findings tend to be based on small, unrepresentative studies. The National Longitudinal Survey of Children and Youth (NLSCY) is the first large-scale study using a representative national sample of babies to examine temperament and its outcome in later child development.

Understanding the Roots of Difficult Temperament: How the NLSCY Can Help

The data gathered in the NLSCY can be used to test complementary explanations of difficult temperament as partly biological and/or psychosocial. Cycle 1 of the NLSCY included a well established measure of temperament as perceived by the person most knowledgeable about the child (PMK), namely the Infant Characteristic Questionnaire.¹⁵ It also contained indicators of medical/health factors and psychosocial factors, which could all — singularly or in combination — contribute to shaping a child's temperament within the first three years of life. These are shown in Appendices 1 to 3. When subsequent waves of data are available for the children first assessed as

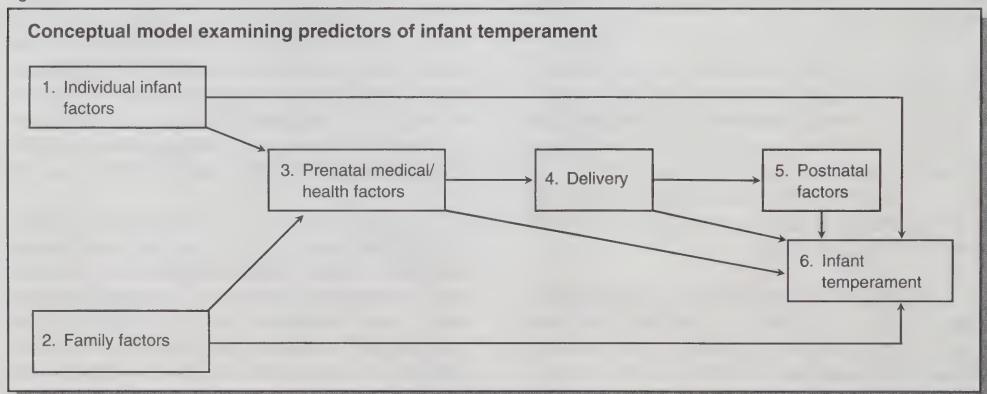
infants in 1994–1995, clearer conclusions may be drawn about factors which predict various types of temperament. Furthermore, early temperamental characteristics could be used to predict later psychological problems.

Figure 1 illustrates the conceptual model being tested by using multiple logistic regression. A wide array of factors included in the NLSCY questionnaires is included in the boxes which are entered as separate blocks in a forward stepwise regression. The boxes are numbered from 1 to 5 in order to indicate the time sequence in which each factor is thought to influence the outcome of difficult infant temperament (box 6), although all were measured at the same time.

The first box contains fixed individual factors, like baby's age, birth order, gender and ethnic origin. The second box includes factors which may have been present in the family before pregnancy. Some of these are psychosocial, while others may reflect a genetic or biomedical basis.* Psychosocial factors include maternal characteristics (mother's age and education); paternal characteristics (father's age and education); and family characteristics (income, family functioning, neighbourhood, social support and behaviour problems in siblings). In addition, maternal pre-pregnancy health and tobacco and alcohol use were included as medical/health influences. These early family factors, present in the family before the child was conceived, could influence child temperament not only directly but also indirectly, through pregnancy, delivery and postnatal complications (boxes 3, 4 and 5, respectively).

* A companion study of twins is currently under way to address the issue of genetic influences on temperament.¹⁶

Figure 1



Boxes 3 and 4 focus on medical/health factors. Box 3 focuses on the mother's health before the baby's birth and during pregnancy (presence of diabetes, high blood pressure, smoking, alcohol and drug use during pregnancy). Box 4 centres on the delivery itself (gestational age, birth weight, type of delivery).

The postnatal environment is illustrated in box 5. The mother's postnatal health, child care and parenting are the medical and psychosocial factors assessed.

The outcome measure (box 6) distinguishes difficult babies from non-difficult babies by selecting those boys and girls who scored in the top 10% of the sample on the difficult temperament measure, as rated by the PMK (mothers in 92% of cases), and comparing them with the rest of the sample.[†] Since difficult temperament is more common in boys than girls, analyses pertain to the top 10% of each sex. Analyses are divided into three age groups: 3 to 11 months old ($n = 1,390$);[‡] 12 to 23 months old ($n = 1,724$); and 24 to 36 months old ($n = 1,494$).

How Do Medical or Health Factors Predict Difficult Infant Temperament?

The odds of having a difficult baby were not associated with a number of medical/health factors once we controlled statistically for the psychosocial factors that were present before the pregnancy. Difficult temperament in an infant was not predicted by the mother's high blood pressure, the use of tobacco and alcohol before and during the pregnancy, medication during pregnancy, delivery of the baby by Caesarean section, the baby's stay in intensive care after birth, or postpartum

[†] Only one index child per family was chosen, at random; the other children in the family aged 3 months to 11 years were considered his/her siblings.

[‡] "n" represents the total sample size for each age group, i.e., it includes the difficult and non-difficult babies.

[§] A score of 2 standard deviations below the mean represents approximately the extreme 2.5% of the sample.

^{**} Low birth weight is usually defined as less than 2,500 g; very low birth weight is defined as less than 1,500 g.

^{††} A family was considered to be functioning poorly when its members showed difficulties resolving problems, communicating, controlling antisocial behaviour, and showing and receiving affection.

complications such as infection, hemorrhage or hypertension in the mother.

For infants aged 3 to 11 months, a birth weight of 2 standard deviations below the mean[§] (2,300 g or less**) increased the likelihood of difficult temperament by 56% compared with those who were of average birth weight. Other things being equal, forceps delivery reduced the odds of the infant being perceived as difficult by 79%. Pregnancy diabetes increased the odds of a 12- to 23-month old baby being difficult by 151%. In the group of infants aged 24 to 36 months, preterm birth (at less than 258 days' gestation) increased the odds of being perceived as difficult by 75% compared with at-term or tardy birth. The relationships between the use of forceps, birth weight and prematurity will need to be examined more closely in order to understand their unique contributions to parental perceptions of infant temperament.

How Do Psychosocial Factors Predict Infant Temperament?

Psychosocial factors seemed to have the greatest influence on perceived difficult temperament of newborns and infants up to the age of 3 years. For children under 1 year of age, lower family functioning^{††} and fewer positive parent-child interactions predicted difficult temperament. A score of 2 standard deviations above the mean on these two variables decreased the likelihood of having a difficult baby by 38% and 39% respectively (see Figure 2).

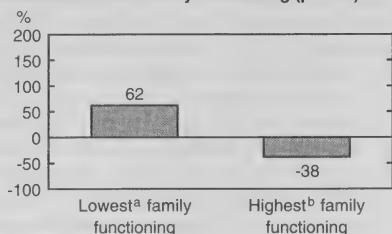
The characteristics of siblings in a family also had an impact on perceived infant temperament. For example, the presence of a highly hyperactive sibling nearly doubled the odds of an infant being perceived as difficult. Highly anxious siblings raised these odds by 128% (see Figure 3). Finally, postpartum depression in the mother increased the odds of having a difficult baby more than twofold (136%).

Difficult temperament in children aged between 12 and 23 months was predicted in part by family functioning, age of the person most knowledgeable about the child (PMK; mothers in 92% of cases) and years of education of the spouse (see Figure 4). Families with the lowest level of functioning increased the odds of having a difficult infant by

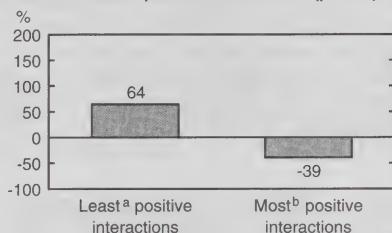
Figure 2

Odds of perceiving baby as difficult at 3 to 11 months: family factors

A. Relative to mean family functioning ($p < .05$)



B. Relative to mean positive interactions ($p < .05$)



^a "Lowest" and "least" refer to 2 standard deviations below the mean.

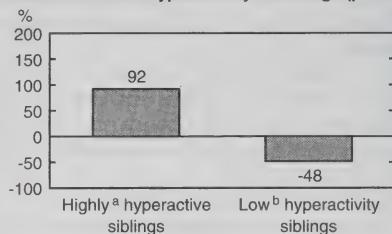
^b "Highest" and "most" refer to 2 standard deviations above the mean.

Source: NLSYC

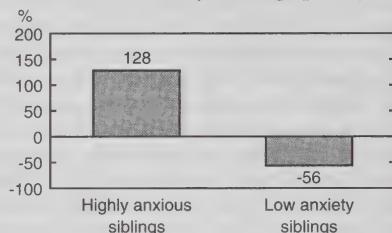
Figure 3

Odds of perceiving baby as difficult at age 3 to 11 months: sibling characteristics

A. Relative to mean hyperactivity in siblings ($p < .05$)



B. Relative to mean anxiety in siblings ($p < .01$)



^a "Highly" refers to 2 standard deviations above the mean.

^b "Low" refers to 2 standard deviations below the mean.

Source: NLSYC

93%. The youngest mothers almost doubled the odds of an infant being rated as difficult (96%) and the fewest years of education of the spouse raised these odds by 75%. In addition, the presence of siblings increased more than twofold the odds of reporting a difficult infant (118%). Finally, the most hostile parents, as reflected by self-reports of being annoyed with the infant or telling the infant that he is bad, had a threefold increase in the odds of rating their infant as difficult.

A similar picture emerged for children aged from 24 to 36 months (see Figure 5). The age of mothers, years of education of the spouse, presence of siblings and parental hostility all increased the odds of an infant being rated difficult.

The infants born to the youngest mothers had greater odds (by 69%) of having a difficult temperament. In contrast to the group of infants aged 12 to 23 months, the *highest* paternal education raised by half the odds of an infant aged from 24 to 36 months being perceived as difficult. Having siblings also increased these odds — by

66%. However, it is the self-reported parental hostility which most strikingly augmented the odds of an infant being rated as difficult. In the most hostile families, the odds were 765% greater than in families with average hostility scores.

Conclusion

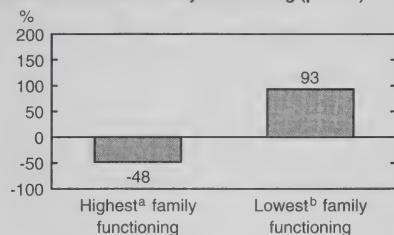
In summary, a parent's report of a baby with a difficult temperament often reflected the psychosocial environment in which their baby was growing up. Specifically, the babies perceived to be more difficult were from families in which overall family functioning was lower, parents were hostile to their baby, and the mother was young or depressed postpartum. The presence of siblings also exacerbated the impact of family functioning on perceived temperament. Note that neither family income nor ethnic origin had any bearing on having a difficult baby once other family characteristics were taken into account.

Perhaps babies in such families become difficult because of the quality of care they receive.

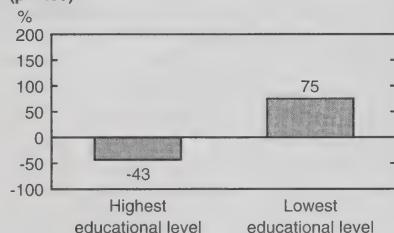
Figure 4

Odds of perceiving baby as difficult at age 12 to 23 months: family factors

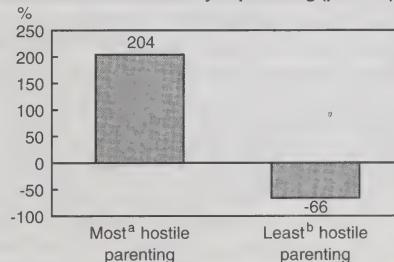
A. Relative to mean family functioning ($p < .01$)



B. Relative to mean years of education of spouse ($p < .05$)



C. Relative to mean hostility in parenting ($p < .001$)



^a "Highest" and "most" refer to 2 standard deviations above the mean.

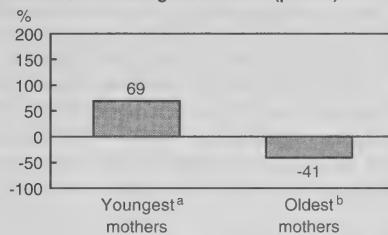
^b "Lowest" and "least" refer to 2 standard deviations below the mean.

Source: NLSYC

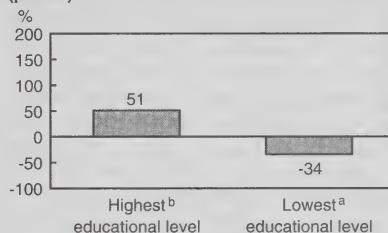
Figure 5

Odds of perceiving infant as difficult at 24 to 36 months: family factors

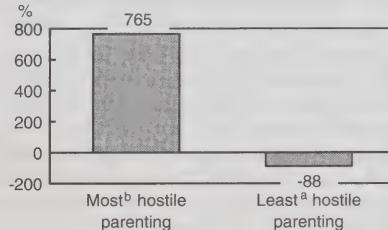
A. Relative to mean age of mothers ($p < .05$)



B. Relative to mean years of education of spouse ($p < .05$)



C. Relative to mean hostility in parenting ($p < .001$)



^a "Youngest," "lowest" and "least" refer to 2 standard deviations below the mean.

^b "Oldest," "highest" and "most" refer to 2 standard deviations above the mean.

Source: NLSYC

Because of lower levels of family functioning and positive interactions and higher levels of hostility, their parents, who must also meet the needs of their other child or children, are less able to respond sensitively to the needs of their infants. The younger mothers may be particularly vulnerable in this regard. If a parent feels some hostility or lack of energy or interest (as in postpartum depression) toward the baby, then positive interactions are rare and effective parenting becomes quite a challenge, especially when the baby responds to its caretaker

with fussing, irritability and attention-seeking. Furthermore, a delayed response from a hostile or young, inexperienced parent may cause the baby to be very difficult to soothe, as it has become too upset.

In the families with the youngest babies (those aged 3 to 11 months), the presence of hyperactive or anxious siblings coincided with a perception of difficult infant temperament. One could cautiously speculate that the hyperactive or anxious children in these families were once difficult babies

themselves. However, in the older age groups, the mere presence of additional children in the family was associated with difficult infant temperament. Again, this suggests that the young mothers had a hard time managing the behaviours of all their children — and that their babies fussed more and demanded more attention, while their older children were more hyperactive and anxious. Alternatively, it may be that young mothers *perceived* their babies to be more difficult when other children were present, or perceived siblings to be more hyperactive or anxious when a young infant was difficult.

Could difficult infant temperament lead to hostility and postpartum depression in parents? Fussy, cranky babies who are difficult or impossible to soothe may well elicit hostility in their parents, or a feeling of helplessness, as seen in depression. Temperament, parenting and the mother's mental health were all measured at the same time, so it is difficult to discern the causes and the effects. However, the young age of the mother was one factor that was present before the birth of the difficult baby. It is likely that lower family functioning was also present before the baby's arrival. Postnatal depression and hostility are probably not solely the result of the addition of a difficult baby to the family, although the influence may be bi-directional.

The same question can be raised with regard to sibling anxiety and hyperactivity. Does the presence of a baby with difficult temperament create anxiety or hyperactive behaviours in the older siblings? The NLSCY follow-up of the babies into childhood will help clarify this important issue of the direction of cause and effect.

The influence of the spouse's (usually fathers) years of education on difficult infant temperament is not clear. In the group of infants aged 12 to 23 months, the *less* educated fathers had difficult babies; in the older cohort (24- to 36-month-olds), it was the *more* educated fathers who had difficult children. Clearly, a closer examination of the NLSCY data is needed to clarify how a father's educational level can influence a mother's perception of infant temperament.

The interpretation of the relation between health factors and temperament is also hazardous. Birth weight and gestational age are highly correlated. A premature or low birth weight baby had greater odds of being rated difficult by his caretaker, at least in the youngest and oldest cohorts. It is not clear how pregnancy diabetes

predisposed the 12- to 23-month-olds to having a difficult temperament, nor how the use of forceps reduced the odds of 3- to 11-month-olds being rated difficult. It may be that these initial differences disappear as the children grow up, or that each sub-group develops along a distinct curve. Again, the follow-up of the NLSCY cohorts will help elucidate these questions.

The major clinical implication of these findings is that when a parent complains to a health or social service practitioner about having a difficult baby, the professional needs to assess parenting practices, family functioning and the mental health of the parent. It is not enough for physicians to look for potential medical causes or ascribe difficult temperament to teething, sleep deprivation or intolerance to certain foods.

From a developmental perspective, the prevention of difficult infant temperament can begin even before conception. Referring back to the analytical model (Figure 1), intervention should begin by improving family functioning. This could be done, for example, by teaching prospective parents how to improve communication in the family, and by increasing their social and mutual support. Young mothers with hyperactive children especially could be targeted since they are more likely to perceive a new baby as difficult. During pregnancy, it would be important to ensure adequate nutrition and reduce smoking, two behaviours that have been shown to prevent low birth weight and prematurity. Once the baby is born, parental mental health needs to be monitored since the alleviation of postpartum depression in the mother could reduce the odds of having a difficult baby. Finally, attention should be paid to parent-child interactions. More specifically, fostering sensitive parenting practices could help parents to respond more positively to their infants' difficult behaviours. More effective parenting may break the cycle of hostile interactions that cause more fussiness and irritability on the part of the child, which in turn cause more hostility in parents. A Dutch intervention study has shown that teaching mothers of low socioeconomic status to be more sensitive and responsive to their irritable infants decreased the amount of crying, and increased their child's sociability, self-soothing and exploration.¹⁷ In other words, irritable infants became less difficult if their mothers responded to their behaviours more sensitively. Even if an infant still has a difficult temperament in comparison with other children, these new skills and improved mental and familial

well-being can mitigate the impact of a difficult child on the family.

The NLSCY cannot at this stage settle the debate about the roots of difficult infant temperament. In particular, parent and sibling characteristics provide only a tentative account of potential genetic contributions to difficult temperament in infancy. Nevertheless, the present data clearly show that once psychosocial factors are taken into account, the causal role of medical/health factors in difficult temperament is weakened. These findings should alert health professionals and policy makers to the fact that difficult temperament is a family issue, and is not limited to an individual child. Difficult babies may not be receiving adequate, sensitive care. Unfortunately, their protests, which take the form of cranky, fussy, attention-demanding behaviour, may trigger even more hostile responses from their social environment. These results emphasize the importance of assessing psychosocial factors in order to intervene appropriately and effectively in families with difficult babies. The result should be a healthier family with a happier baby. If difficult infant temperament is truly a predictor of problem behaviour in childhood, then a child's future could be improved from the very first months of life.

References

1. Coffman, S., M. J. Levitt, N. Guacci and M. Silver. 1992. "Temperament and interactive effects: mothers and infants in a teaching situation." *Issues in Comprehensive Pediatric Nursing*, 15: 169-182.

2. Gross, D., and B. Conrad. 1995. "Temperament in toddlerhood." *Journal of Pediatric Nursing*, 10: 146-151.

3. Medoff-Cooper, B. 1995. "Infant temperament: implications for parenting from birth through one year." *Journal of Pediatric Nursing*, 10: 141-145.

4. Melvin, N., and S. McClowry. 1995. "Clinical applications of children's temperament." *Journal of Pediatric Nursing*, 10: 139-140.

5. Bates J. E. "Temperament in infancy." 1987. In *Handbook of Infant Development*. Edited by J. Osofsky. New York: Wiley.

6. Bates, J. E., K. Bayles, D. S. Bennett, B. Ridge and M. M. Brown. 1991. "Origins of externalizing behavior problems at eight years of age." In *The development and treatment of childhood aggression*. Edited by D. J. Pepler and K. H. Rubin. Hillsdale, NJ: Lawrence Erlbaum.

7. Chess, S. 1990. "Studies in temperament: a paradigm in psychosocial research." *Yale Journal of Biology and Medicine*, 63: 313-324.

8. Goldsmith H. H., A. H. Buss, R. Plomin, et al. 1987. "Roundtable: what is temperament? Four Approaches." *Child Development*, 58: 505-529.

9. Adair, R. H., and H. Bauchner. 1993. "Sleep problems in childhood." *Current Problems in Pediatrics*, 23: 147-170.

10. Oberklaid, F., M. Prior, K. Sanson, J. Sewell and M. Kyrios. 1990. "Assessment of temperament in the toddler age group." *Pediatrics*, 85: 559-565.

11. Oberklaid, F., A. Sanson, R. Pedlow and M. Prior. 1993. "Predicting preschool behavior problems from temperament and other variables in infancy." *Pediatrics*, 91: 113-120.

12. Bates, J. E., and K. Bayles. 1984. "Objective and subjective components in mothers' perceptions of their children from age 6 months to 3 years." *Merrill-Palmer Quarterly*, 30: 111-130.

13. Bates, J. E., C. A. Maslin and K. A. Frankel. 1985. "Attachment, security, mother-child interaction and temperament as predictors of behavior-problem ratings at age three years." In *Growing Points of Attachment Theory and Research*. Edited by I. Bretherton and E. Waters. Chicago: Society for Research in Child Development.

14. Schraeder, B. D., M. A. Heverly and J. Rappoport. 1990. "Temperament, behavior problems and learning skills in very low birth weight preschoolers." *Research in Nursing and Health*, 13: 27-34.

15. Bates, J., C. Freeland and M. L. Lounsbury. 1979. "Measurement of infant difficultness." *Child Development*, 50: 794-803.

16. Pérusse, D. 1995. "The Quebec longitudinal twin study of infant temperament." Paper presented at the 42nd Annual Meeting of the American Academy of Child and Adolescent Psychiatry, New Orleans.

17. van den Boom, D. C. 1994. "The influence of temperament and mothering on attachment and exploration: an experimental manipulation of sensitive responsiveness among lower-class mothers with irritable infants." *Child Development*, 65: 1457-1477.

Appendix 1. Results of logistic regression^a for babies aged 3 to 11 months (n = 1,390)

	Step 1 Odds ratio	Step 2 Odds ratio	Step 3 Odds ratio	Step 4 Odds ratio	Step 5 Odds ratio
Block 1: Infant factors					
Age					
Birth order					
Sex					
Ethnic origin					
Block 2: Family factors					
<i>A. Family characteristics</i>					
Income					
Family functioning		1.35 ^c			1.33 ^c
Social support					1.27 ^b
<i>B. Maternal characteristics</i>					
Age at birth of infant					
Education					
<i>C. Paternal characteristics</i>					
Age at birth of infant					
Education					
<i>D. Sibling characteristics</i>					
Siblings (relative to none)	.65 ^a			.66 ^a	.63 ^b
Aggression					
Anxiety	1.42 ^b			1.47 ^c	1.51 ^b
Hyperactivity	1.52 ^c			1.45 ^b	1.39 ^b
Prosociality					
Block 3: Prenatal health					
Diabetes					
High blood pressure					
Tobacco use					
Alcohol use					
Use of drugs and medication					
Block 4: Delivery					
Caesarean					
Forceps			.25 (p=.06)		.21 ^b
Intensive care					
Birth weight				.77 ^c	.80 ^b
Gestational age					

Continued on next page

	Step 1 Odds ratio	Step 2 Odds ratio	Step 3 Odds ratio	Step 4 Odds ratio	Step 5 Odds ratio
Block 5: Postnatal factors					
Breast-feeding (relative to never)					
Breast-fed 8 weeks or less					
Breast-fed 9 weeks to 6 months					
Breast-fed more than 6 months					
Currently breast-feeding					
Parenting: Hostility					
Parenting: Positive interactions					.78 ^b
Special medical care (infant)					
Mother's health					
Tobacco use					
Alcohol use					
Postpartum depression (relative to none)					2.36 ^d
Improvement X²	X ² = 27.476 df = 3 p = .0000		X ² = 11.438 df = 2 p = .0033		X ² = 14.959 df = 2 p = .0006
Residual X²	X ² = 2.978 df = 4 p = .5615	X ² = 4.741 df = 10 p = .9078	X ² = 19.246 df = 10 p = .0372	X ² = 3.859 df = 3 p = .2771	X ² = 7.485 df = 11 p = .7585

^a For continuous variables, odds ratio is calculated using 1 standard deviation from the mean.^b p < .05^c p < .01^d p < .001^e Not statistically significant.

Source: NLSCY

Appendix 2. Results of logistic regression^a for infants aged 12 to 23 months (n = 1,724)

	Step 1 Odds ratio	Step 2 Odds ratio	Step 3 Odds ratio	Step 4 Odds ratio	Step 5 Odds ratio
Block 1: Infant factors					
Age					
Birth order					
Sex					
Block 2: Family factors					
<i>A. Family characteristics</i>					
Income					
<u>Family functioning</u>					
Social support					
	1.45 ^c			1.41 ^c	
					1.39 ^b
<i>B. Maternal characteristics</i>					
Age at birth of infant					
Education					
	.74 ^b			.71 ^b	
					.72 ^b
<i>C. Paternal characteristics</i>					
Age at birth of infant					
Education					
	.74 ^c			.78 ^b	
					.75 ^b
<i>D. Sibling characteristics</i>					
<u>Siblings</u> (relative to none)					
Aggression					
Anxiety					
Hyperactivity					
Prosociality					
	1.85 ^b			1.81 ^b	
					2.18 ^c
Block 3: Prenatal health					
<u>Diabetes</u>					
High blood pressure					
Tobacco use					
Alcohol use					
Use of drugs and medication					
				2.31 ^b	
					2.51 ^c
Block 4: Delivery					
Intensive care					
Birth weight					
Gestational age					

Continued on next page

Appendix 2 — *Continued*

	Step 1 Odds ratio	Step 2 Odds ratio	Step 3 Odds ratio	Step 4 Odds ratio	Step 5 Odds ratio
Block 5: Postnatal factors					
Parenting: Hostility					1.74 ^d
Parenting: Positive interactions					
Tobacco use					
Alcohol use					
Improvement χ^2	$\chi^2 = 29.236$ df = 3 p = .0000	$\chi^2 = 4.578$ df = 1 p = .0324			$\chi^2 = 22.853$ df = 1 p = .0000
Residual χ^2	$\chi^2 = 5.186$ df = 3 p = .1587	$\chi^2 = 10.308$ df = 10 p = .4139	$\chi^2 = 3.391$ df = 9 p = .9468	$\chi^2 = .10598$ df = 3 p = .6599	$\chi^2 = 7.104$ df = 7 p = .4181

^a For continuous variables, odds ratio is calculated using 1 standard deviation from the mean.

^b $p < .05$

^c $p < .01$

^d $p < .001$

Source: NLSCY

Appendix 3. Results of logistic regression^a for infants aged 24 to 36 months (n = 1,494)

	Step 1 Odds ratio	Step 2 Odds ratio	Step 3 Odds ratio	Step 4 Odds ratio
Block 1: Infant factors				
Age				
Birth order				
Sex				
Ethnic origin				
Block 2: Family factors				
<i>A. Family characteristics</i>				
Income				
Family functioning				
Social support				
<i>B. Maternal characteristics</i>				
Age at birth of infant		.64 ^d	.63 ^d	.77 ^b
Education				
<i>C. Paternal characteristics</i>				
Age at birth of infant			1.25 ^c	1.23 ^b
Education				
<i>D. Sibling characteristics</i>				
Siblings (relative to none)		2.10 ^d	2.22 ^d	1.67 ^c
Aggression				
Anxiety		1.42 ^d	1.43 ^d	1.13 ^c
Hyperactivity				
Prosociality				
Block 4: Delivery^f				
Birth weight				
Gestational age (premature or tardy)			2.11 ^c	1.75 ^b
Block 5: Postnatal factors				
<i>Parenting: Hostility</i>				
Parenting: Positive interactions				2.94 ^d
Tobacco use				
Alcohol use				
Improvement X²				
	X ² = 31.821	X ² = 8.039	X ² = 145.47	
	df = 3	df = 1	df = 1	
	p = .0000	p = .0046	p = .0000	
Residual X²				
	X ² = 7.971	X ² = .222	X ² = 4.440	
	df = 4	df = 1	df = 3	
	p = .0926	p = .4839	p = .2177	

^a For continuous variables, odds ratio is calculated using 1 standard deviation from the mean.

^b p < .05

^c p < .01

^d p < .001

^e Not statistically significant.

^f Block 3 variables (Prenatal health) were not measured for this age group.

Source: NLSY

Indicators of Mathematics Achievement in Canadian Elementary Schools

J. Douglas Willms

To what extent do levels of academic achievement differ between males and females, or vary among students with differing economic and social-class backgrounds? Do levels of achievement vary among the ten Canadian provinces, and if so, why do some provinces do better than others? How well do students in Canada fare in international comparisons of academic achievement? Answers to these questions will provide insight into the strengths and weaknesses of our schools and schooling systems, and will have implications for education policy and practice.

During the last decade, educators and administrators in Canada, the U.S., and most countries in Western Europe have conducted large-scale assessments to monitor the quality of their schooling systems. Some countries have established national and regional monitoring systems that produce indicators of school performance on a regular basis. Assessments at a national or provincial level can serve at least four different functions: to provide the basis for a continuing record of progress; to examine inequalities in attainment between the sexes and among racial, ethnic and social-class groups; to make comparisons among various subunits such as schools, school districts, or provinces; and to evaluate the effectiveness of particular educational interventions.¹

In the past, administrators at national and provincial levels collected data on such factors as student-teacher ratios, expenditures on educational materials, teacher qualifications and the proportion of students requiring special education. The emphasis was on ensuring that there was an equitable distribution of funding and that all schools met some minimum standard. In some jurisdictions, data were collected also on a few outputs of the

educational system, such as graduation rates and students' test scores.

The new monitoring programs, however, differ in several respects. One is that government agencies have begun collecting data on a wider range of variables. The data cover a broader array of curricular tests and include a number of non-cognitive outcomes such as students' attitudes towards school, physical and mental well-being, participation in extra-curricular activities, and post-secondary destinations. The measures place less emphasis on the final stages of secondary school and greater emphasis on monitoring students' progress during their entire school career. Finally, the monitoring systems collect data on a number of schooling processes, such as school disciplinary climate or parental involvement in schools, in an attempt to answer questions about why some schools or schooling systems perform better than others.

This research paper presents findings pertaining to children's scores on the Peabody Picture Vocabulary Test – Revised (PPVT) in English or the *Échelle de vocabulaire en images Peabody* (EVIP) in French at ages 4 and 5, and achievement in elementary school mathematics at grades 2, 4 and 6, based on data from the first wave of data from the National Longitudinal Survey of Children and Youth (NLSCY).

Scores on the PPVT* are a relatively good predictor of later school success and, as such, could be considered one indicator of the "pool of ability" of students entering the schooling system. Details

* The acronym PPVT will be used in this paper from now on to designate both the Peabody Picture Vocabulary Test – Revised and the *Échelle de vocabulaire en images Peabody*.

pertaining to the administration of the PPVT and the mathematics tests for English- and French-speaking children are provided in the Technical Appendix to this publication; information on reliability and validity is found in the NLSCY's *User's Guide*. The analyses in this paper examine the relationships between students' scores on these tests and their family background characteristics. The analyses also estimate the average test scores for each province, with a statistical adjustment for the most important socioeconomic background factors that affect school performance. These provincial estimates are anchored to the results of two international studies and one other national study of mathematics achievement. This research paper is the first step in a larger effort to examine the effects of various schooling inputs and processes on schooling outcomes in Canada.

Conceptual Framework

The Input-Process-Output Model

One of the principal questions in educational research is whether schools differ in their effects on students' outcomes, and if so, why. Research on this question has been based on a theory that presumes students' schooling outcomes are largely determined by students' ability upon entry to school, the influences of the family, and their experiences at school. The research attempts to isolate the "added value" of schooling from the effects associated with the child's ability and family background, and to discern which schooling processes are most strongly related to schooling outcomes.²

The research has shown that there are large and significant differences among schools in their outcomes, even after taking account of students' family background characteristics, and that the differences among schools are related to measurable schooling processes that can be influenced by teachers' and administrators' policies and practices.³⁻⁵ Schooling processes include factors that represent the inner workings of school life: how students are organized for instruction; the formal and informal rules governing the operation of the school; the nature of interactions between participants; and teachers' and students' attitudes, values, and expectations. Research on schooling processes suggests that students achieve better outcomes in schools with a favourable disciplinary climate, strong parental involvement, and high staff expectations of student performance.⁶

Levels and Gradients

Researchers are concerned not only with levels of educational outcomes, but also with gradients. The term *gradient* refers to the relationship between educational outcomes and social status, represented by factors such as parents' education, occupation and income. The term can refer also to gaps in educational outcomes between minority and majority groups or between males and females. Thus gradients are a measure of the extent of inequality between students with differing status. A measure of a schooling system's success is whether it can achieve both high levels of academic attainment and relatively shallow gradients — in other words, the differences in its students' attainment are relatively unrelated to social status.

The prevailing view of many researchers is that gradients are unchangeable. Heath⁷ maintains that class inequalities in educational attainment in England and Wales have been relatively constant throughout this century. The notion that gradients are unchangeable has been accompanied by a growing pessimism about the outcome of the liberal-democratic reforms of the last four decades. The most prominent of these reforms was the reorganization of schooling that took place in many Western European countries during the late 1960s and early 1970s. Prior to the mid-sixties, most countries operated a two- or three-tier system in which children were allocated to vocationally or academically oriented schools.⁸ The reform called for one type of secondary school — the comprehensive school — which served all children within designated catchment areas. Its aim was not only to improve educational attainment, but to reduce inequalities between children from differing social-class backgrounds.

The countervailing and more optimistic view of gradients is that there are subtle but powerful mechanisms embedded in our societies that lead to a stability in levels of outcomes and social-class gradients, but that these mechanisms can be altered through policy, practice and reform. Supporting this view are findings from educational research that show there are large, significant differences among schools, school districts and communities in their levels of schooling outcomes and their social-class gradients.^{1,9,10} Moreover, longitudinal research on the effects of the comprehensive schooling reform in Scotland found that the reform reduced the segregation of pupils along social-class lines and significantly altered

gradients by improving levels of performance amongst pupils from working-class backgrounds.¹¹

Research on gradients in educational outcomes is particularly relevant to Canadian education policies regarding denominational schooling, second-language immersion programs, streaming of students within schools, and public support of private and charter schools.

The results for the analyses reported in this article were estimated as "effect sizes" (see Appendix 1). An effect size of 0.1 on the tests used in this study (as well as on most standardized achievement tests) represents about one month of schooling during the elementary grades. Therefore, to simplify the presentation, the term "month of schooling" will be used in reporting the findings.

Findings for the NLSCY

The Data and the Sample

The analyses reported in this study are based on the first wave of data collected in Cycle 1 of the NLSCY. The analyses use data on the PPVT, the mathematics achievement tests, the child's sex, and seven variables describing the students' family background: the level of education of the "person most knowledgeable" about the child (PMK),[†] the father's level of education, the prestige of the parents' occupations,[‡] household income, whether the child lived in a single- or two-parent family, and the number of siblings.[§] The analysis did not include a measure of the ethnic or cultural group of the child or parent, or a measure of the language the child first learned at home. Data on ethnic and cultural group are difficult to analyse because many respondents indicated their ancestry was Canadian and some other ethnic or cultural group. Moreover, for 96.6% of the children in the sample, either English or French was the language the child first learned at home and could still understand,^{**} the mothers of 96.3% of the children indicated that the children were either born in Canada or had immigrated before 1985. Consequently, estimates of ethnic or cultural differences in test performance could not be reliably estimated, and it is unlikely that controlling for ethnicity and cultural group would appreciably affect the estimates reported in these analyses.

A variable denoting socioeconomic status (SES) was constructed based on the scores for the mothers' and fathers' level of education and occupations, and household income. It was standardized on the full sample of NLSCY families.¹² The SES measure is useful for describing the overall characteristics of the sample and for making comparisons in socioeconomic gradients.

Appendix 2 discusses characteristics of the NLSCY sample.

The Effects of Family Background

PPVT

Family background had a noticeable effect on vocabulary skills, as measured by the PPVT. First of all, boys and girls scored equally well on the test. The mother's level of education had a much stronger effect on a child's verbal ability than the father's. On the other hand, the prestige of the father's occupation had a strong effect. Household income had a relatively small effect. PPVT scores for children living in single-parent families were, on average, lower than the scores of children in two-parent families, as were scores for children in large families compared with children in smaller families. The composite measure of socioeconomic status explained nearly 10% of the variation in PPVT scores.

[†] The PMK was the mother in over 90% of the cases. Consequently, the term "mother" will be used throughout this article for the sake of simplicity. Similarly, "father" will be used instead of "spouse of the PMK." See the Technical Appendix for further details.

[‡] The occupation variable was based on a modified version of a scale developed by Pineo, Porter and McRoberts (Pineo, P. C., J. Porter and H. A. McRoberts. 1977. "The 1971 Census and the socioeconomic classification of occupations." Canadian Review of Sociology and Anthropology, 14: 91-102). High scores on the scale indicate more prestigious occupations. See Willms and Shields for more details (Willms, J. D., and M. Shields. 1996. A measure of socioeconomic status for the National Longitudinal Survey of Children and Youth. Report for the Special Surveys Division. Ottawa: Statistics Canada).

[§] Level of education was expressed in years of schooling. Occupations were categorized into 16 socioeconomic categories based on the schema devised by Pineo, Porter, and McRoberts (see above), and then scaled and standardized for the full sample using a technique suggested by Mosteller and Tukey (Mosteller, F., and J. W. Tukey. 1977. Data Analysis and Regression. Reading [MA]: Addison-Wesley). Household income was based on the total family income and expressed in units of \$1,000. The determination of family structure included step-parents.

^{**} If the child could no longer understand the first language learned, the second language learned was considered to be the first language.

Mathematics Scores

At the grade 2 level, girls scored about two months of schooling lower than boys, but by grade 4, girls' scores were about one month of schooling higher. By grade 6, the gap had increased to about two-and-a-half months of schooling in favour of girls. These results are consistent with a study conducted in 31 elementary schools in British Columbia,¹³ which found that sex differences in mathematics computation at the end of grade 3 were negligible, but that girls advanced at a slightly faster pace between grades 3 and 7. Sex differences were negligible, however, in growth trajectories for mathematics concepts and problem-solving. Perhaps the most interesting finding of the British Columbia study was that boys' scores spread out more than females' scores as the children progressed through the elementary grades. By the end of grade 7, there were more boys than girls at the top and bottom ends of the distribution, even though the average levels of performance were comparable. When subsequent cycles of data from the NLSCY become available, it will be possible to examine academic growth trajectories for a large national sample of children.

The mother's level of education was consistently the strongest predictor of mathematics achievement across the three grade levels (although it was not statistically significant for children at grade 6). All other factors were not statistically significant, with the exception of household income for grade 4 mathematics. At each grade level, the explanatory variables accounted for only about 5% of the variation in test scores. This is a relatively small percentage: in comparable studies in the U.S. and the U.K., the percentage of variation in mathematics achievement explained by similar measures of family background ranged from 10% to 15% at the elementary and middle school levels.^{5,6}

The SES composite was a statistically significant predictor of mathematics scores at each grade level, but to a lesser extent than in many other countries. These findings suggest that inequalities in mathematics achievement along social-class lines are somewhat less in Canada than elsewhere.

Refer to Appendix 3 for a more detailed explanation of the effects of family background on vocabulary skills and mathematics scores.

Differences among Provinces

PPVT

Appendix 4 illustrates the results of analyses estimating how well a child with nationally average family-background characteristics scored on the PPVT in each province. Seven of the ten provinces are reasonably close to the national average. The exceptions are Newfoundland, Nova Scotia and Saskatchewan. The adjusted averages for these provinces are significantly higher than those of Ontario, British Columbia, Manitoba and New Brunswick. The difference is reasonably large in substantive terms.

Mathematics Scores

There are large and statistically significant differences among the provinces in their adjusted mathematics scores.

At the grade 2 level, only one province — Ontario — scored more than one month of schooling below the national average. The score for Ontario is significantly different from the five highest scoring provinces — New Brunswick, Manitoba, Nova Scotia, British Columbia and Quebec — which had SES-adjusted scores that ranged from one to four months of schooling above the national average.

At the grade 4 level, the SES-adjusted scores for Quebec were remarkably high — about six months of schooling higher than the national average — and were significantly higher than those of all other provinces. Newfoundland's SES-adjusted scores were also high, and were significantly different from the scores for the six provinces that scored below the national average. The estimates for the six provinces with the lowest scores were relatively imprecise. Although their SES-adjusted scores were significantly different from those of Newfoundland and Quebec, they were not significantly different from the national average.

Quebec also had the highest scores at the grade 6 level, and its scores were significantly higher than those of all other provinces. The scores for the other provinces can be divided into three clusters. British Columbia and Prince Edward Island had SES-adjusted scores that were about two-and-a-half months of schooling above the national average. The scores for this cluster were

significantly different from Ontario's, which formed the lowest-scoring cluster. Ontario's SES-adjusted score was about four months of schooling below the national average. The SES-adjusted scores of Manitoba, New Brunswick, Newfoundland, Nova Scotia and Saskatchewan were in the middle of the distribution and within about one month of schooling of the national average.

To summarize the findings for the mathematics test results, it is useful to consider the three largest provinces — British Columbia, Ontario and Quebec. The scores for Quebec were consistently high, and the trend from grade 2 to grade 6 suggests that the advantage increases as the children progress through the elementary grades. The SES-adjusted scores for Ontario were consistently below the national average, and the trend suggests that the students fall further behind as they progress through school. The scores for British Columbia tended to be above the national average, but they were not nearly as high as the scores for Quebec for the later grades. We will find in the next section that this order is consistent with the findings from a large national study of mathematics achievement conducted in 1993 by the Council of Ministers of Education, and with two international studies conducted during the 1980s. The scores for the other provinces could not be estimated with much precision because of the small sample sizes, and consequently the scores fluctuated considerably from grade level to grade level. Taken together, however, the findings suggest that the provinces tend to be fairly similar in their SES-adjusted scores in the early grades, but that the variation amongst provinces increases as the children progress through school.

Results Anchored to International Comparisons

To set the results of the NLSCY into a wider context, they have been anchored to the scores from the International Assessment of Education Progress (IAEP), a study of over 24,000 13-year-old children conducted by the U.S. Educational Testing Service.¹⁴ Four Canadian provinces (New Brunswick, Quebec, Ontario and British Columbia) and five countries (Ireland, Korea, Spain, the U.K. and the U.S.) participated in the IAEP. The average scores for the IAEP provinces and countries were converted to effect sizes (see Appendix 1). The IAEP mean score was considered the international mean. By comparing the weighted average of IAEP scores for the four participating provinces to the weighted average of the grade 6 NLSCY scores

from the same four provinces, the NLSCY scores were placed onto the international scale. Similarly, the scores from the School Achievement Indicators Program (SAIP),¹⁵ were converted to effect sizes and placed on the international scale by comparing the IAEP and SAIP results for the four provinces that participated in the IAEP. Two provinces — Ontario and British Columbia — participated in the Second International Mathematics Study (SIMS).¹⁶ Scores from these two provinces and five countries were added to the international scale. The findings are summarized in Figure 1.

Two conclusions are immediately apparent. One is that all Canadian provinces fare relatively well when compared with other countries. The other is that the differences in levels of mathematics achievement between Ontario, British Columbia and Quebec which were observed for the NLSCY measures also appear in the SAIP results and in the international studies. What is remarkable about the latter finding is that the large differences between these provinces have been evident for almost a decade. The NLSCY results contribute to this portrayal of mathematics outcomes in two ways: they show that the differences are apparent even when one includes adjustment for the students' background characteristics, and that the variation among provinces tends to increase as the students progress through school.

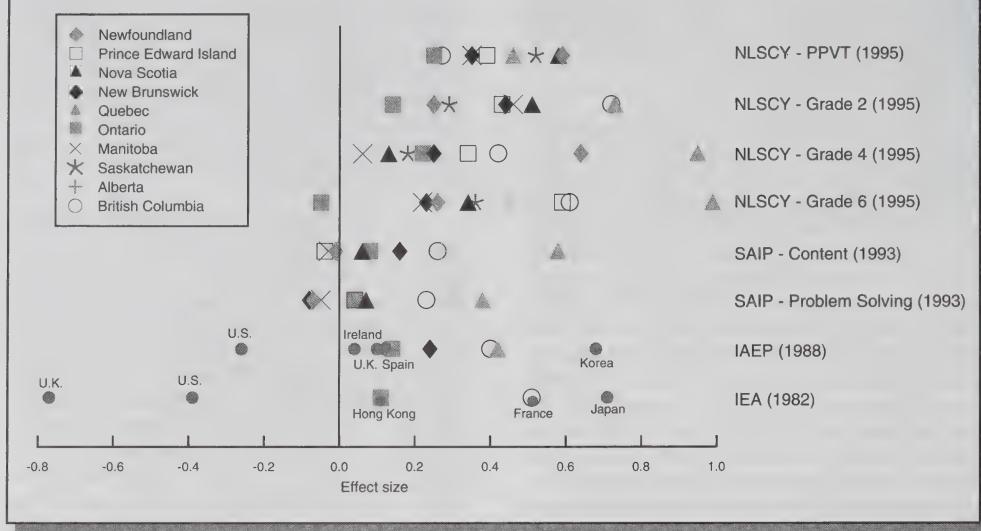
Summary and Discussion

This study examined data from the first wave of NLSCY Cycle 1 data. The analyses estimated the relationships between a number of family background characteristics and children's scores on a test of verbal ability (PPVT) at ages 4 and 5, and scores on a test of mathematics computation in grades 2, 4 and 6. The analyses also provided estimates of differences among provinces in their average levels of verbal ability and mathematics achievement. These results were compared to findings from a previous national study and two international studies of mathematics achievement. There are four principal findings:

- The level of education of the person most knowledgeable about the child (PMK; in most cases the mother) was a significant predictor of children's verbal ability at ages 4 and 5, and of children's mathematics achievement in grades 2 and 4. The level of education of the PMK's

Figure 1

NLSCY and SAIP results compared with two international studies



spouse (in most cases the father) was not an important predictor, but the prestige of the spouse's occupation and the household income were significant predictors of early verbal ability.

- Children's scores on the test of verbal ability were, on average, lower in single-parent families and in large families.
- The social-class gradients were relatively weak for the test of verbal ability and for mathematics scores at all grade levels. This indicates that inequalities in verbal ability and mathematics achievement along social-class lines are not large during the preschool and elementary school years. It may be that preschools and elementary schools offset some of the differences associated with family environment.
- There were large and statistically significant differences among the ten provinces in their mathematics achievement.

One of the strengths of the NLSCY data is that they include data on a number of family background variables such as household income, family structure and types of occupation held by the parents. Most indicator programs collect data from students and

teachers at school, and because students in the early grades are usually not able to accurately report their parents' education or occupation, data on family background are seldom available for the early grades. Consequently, this study provides the first opportunity to estimate social-class gradients at the national level for students in preschool and primary grades.

The data on family background also make it possible to make comparisons among provinces with a statistical adjustment for the family background of the students who completed the tests in each province. Therefore, observed differences among the provinces cannot as easily be attributed to differences in the social or economic background of the students who completed the tests. Newfoundland, for example, the province with the lowest levels of parental education and household income, fares relatively well in the SES-adjusted comparisons for the NLSCY measures. In the SAIP comparisons, which did not include an adjustment for family-background factors, Newfoundland was near the bottom of the distribution. The same applies for Manitoba and New Brunswick; their unadjusted SAIP scores were very low, but their SES-adjusted NLSCY scores were generally close to the national average.

The NLSCY data are presently limited, however, in several respects. The detailed data collected from teachers and administrators are not yet available, and therefore it was not possible to address questions concerning which school processes were related to schooling outcomes. Also, the first cycle of NLSCY data included only one measure of school performance — mathematics computation. Mathematics was chosen for the first cycle of the NLSCY for several practical reasons; for example, it did not present major problems in translation, and a very short test could provide reasonably reliable results. It was chosen also because mathematics results tend to be more strongly related to the effects of schooling than results for other subject areas,⁵ and because mathematics is often considered the "critical filter" for students pursuing careers in scientific and technological fields. Schools that are effective in mathematics tend to be effective in other subject areas¹⁷; however, some provinces or school districts may place relatively greater emphasis on other schooling outcomes. Moreover, one cannot accurately estimate the "added value" of schooling with one cycle of data: accurate estimates require some pre-measure of ability or academic achievement.²⁶ The plan for subsequent cycles of the NLSCY calls for testing in reading comprehension and for further testing in mathematics computation. When data on schooling processes and the second wave of test data become available, it will be possible to estimate the effects of a number of school policies and practices with considerable accuracy.

A further limitation of the NLSCY data is the relatively small sample sizes for some provinces. This limitation mainly affected the accuracy of estimates of test scores at each grade level, particularly for the provinces with smaller populations. The sampling design for the NLSCY allows for provinces to supplement the main sample by increasing the sample size for certain age groups or for particular geographical areas. By piggy-backing on the NLSCY infrastructure, some provinces may be able to garner information for monitoring particular interventions. The advantage of this approach is that the data from the NLSCY Cycle 1 could serve as a baseline, and the scores on the indicators for a province could be compared with those of all other provinces.

These limitations of the NLSCY and the findings of this first set of analyses point to the need for a stronger system for monitoring schooling outcomes

at the national and provincial levels. The analyses found that the mathematics scores in grade 6 were nearly 1 standard deviation higher for Quebec than for Ontario, and that these differences were also evident in the 1993 SAIP study and in two earlier international studies. This difference translates to about one full year of schooling by the end of the elementary school years. The NLSCY data could not cast any light on the reasons for such large differences. One plausible explanation is that the mathematics curriculum for Quebec students is more compressed during the elementary years. Also, the development and approval of curriculum tends to be more centralized in Quebec than in most other provinces. It may be that in Quebec the curriculum enacted in the classroom more closely matches the official (intended) curriculum of the provincial ministry. There may also be cultural differences in the amount of emphasis placed on mathematics achievement at these grade levels. To address this issue, data that describe children's growth in various mathematical domains are required, together with data describing school processes and the intended and enacted curriculum.¹⁸ Data from the Third International Mathematics and Science Study, which will be available in 1997, will help to address some of the questions pertaining to curriculum content.

Despite these limitations, the study reveals two important strengths of the Canadian schooling system. One is that social-class gradients and sex differences in mathematics achievement are relatively small. The set of family background measures used in this study, which is more extensive than is typical of national studies, accounted for less than 5% of the variation in student achievement at the grade 6 level. In other countries, measures of SES generally account for about 10% to 15% of the variation in achievement at this level, and 15% to 25% at the secondary level.^{6,18,19} The results also indicate that although the provinces vary in their achievement levels, all provinces compare favourably with the U.S., the U.K. and several other developed countries.

References

1. Willms, J. D., and A. C. Kerckhoff. 1995. "The challenge of developing new social indicators." *Educational Evaluation and Policy Analysis*, 17: 113-1431.

2. Raudenbush, S. W., and J. D. Willms. 1995. "The estimation of school effects." *Journal of Educational and Behavioral Statistics*, 20: 307–335.
3. Bryk, A. S., V. E. Lee and J. B. Smith. 1990. "High school organization and its effects on teachers and students: an interpretative summary of the research." In *Choice and Control in American Education*: Vol. 1. *The Theory of Choice and Control in Education*. Edited by W. H. Clune and J. F. Witte. London: Falmer Press.
4. Lee, V. E., and J. B. Smith. 1993. "Effects of school restructuring on the achievement and engagement of middle-grade students." *Sociology of Education*, 66: 164–187.
5. Ho, S., and J. D. Willms. 1996. "The effects of parental involvement on eighth grade achievement." *Sociology of Education*, Vol. 69, 126–141.
6. Willms, J. D. 1992. *Monitoring School Performance: A Non-technical Guide for Educational Administrators*. Lewes: Falmer Press.
7. Heath, A. 1990. "Class inequalities in education in the twentieth century." *Journal of the Royal Statistical Society, Series A*, 153: 1–16.
8. Levin, H. M. 1976. "Educational opportunity and social inequality in Western Europe." *Social Problems*, 24: 148–172.
9. McPherson, A. F., and J. D. Willms. 1986. "Certification, class conflict, religion and community: a socio-historical explanation of the effectiveness of contemporary schools." In *Research in Sociology of Education and Socialization*. Vol. 6. Edited by A. C. Kerckhoff. Greenwich (CT): JAI Press.
10. Raudenbush, S. W., and A. S. Bryk. 1986. "A hierarchical model for studying school effects." *Sociology of Education*, 59: 1–17.
11. McPherson, A. F., and J. D. Willms. 1987. "Equalisation and improvement: some effects of comprehensive reorganisation in Scotland." *Sociology*, 21: 509–539.
12. Willms, J. D., and M. Shields. 1996. "A measure of socioeconomic status for the National Longitudinal Survey of Children and Youth." Report for the Special Surveys Division. Ottawa: Statistics Canada.
13. Willms, J. D., and S. Jacobsen. 1990. "Growth in mathematics skills during the intermediate years: sex differences and school effects." *International Journal of Educational Research*, 14: 157–174.
14. Lapointe, A. E., N. A. Mead and G. W. Phillips. 1989. *A World of Differences: An International Assessment of Mathematics and Science*. Princeton (NJ): Educational Testing Service.
15. Council of Ministers of Education [Canada]. 1993. *School Achievement Indicators Program*. Toronto: Council of Ministers of Education.
16. Robitaille, D. F., and R.A. Garden, editors. 1989. *The IEA Study of Mathematics: Contexts and Outcomes of School Mathematics*. Elmsford (NY): Pergamon.
17. Lui, B. 1995. "The stability of school effects." Master's thesis, University of British Columbia.
18. Porter, A. C. 1991. "Creating a system of school process indicators." *Educational Evaluation and Policy Analysis*, 13: 13–29.
19. Willms, J. D., and D. P. Warwick. 1995. "The academic achievement of grade 4 students in Jordan: patterns and influences." Report prepared for the National Center for Educational Research and Development, Amman, Jordan.

Appendix 1. Effect sizes

Estimates of differences among schools, districts or provinces on an achievement test can be expressed in a number of ways: as a percentage of items answered correctly; as percentiles for particular age groups; as age or grade equivalents; or as effect sizes.

Effect sizes are used in this study. They express the magnitude of the effect as a fraction of a standard deviation on the outcome measure.

For example, on the PPVT, the average score for the entire national sample of 4- and 5-year-old children was 99.84; the standard deviation was 15.01. By subtracting the national mean from each child's score and dividing by the standard deviation, the scores are standardized to have a mean of zero and a standard deviation of 1. The same was done for the mathematics tests at each grade level.

Effect sizes are a useful metric because they allow one to judge the substantive significance of differences among subunits and to make comparisons across different types of outcome measures.

For example, if the observed "difference between two provinces in their average grade 2 mathematics scores was 0.20, this would indicate that, on average, students in the higher-scoring province scored about 20% of a standard deviation higher than students in the lower-scoring province. On most standardized achievement tests, 1 standard deviation is roughly equivalent to about one year of schooling during the elementary grades, and about two years of schooling during the secondary grades. Therefore, an effect size of 0.20 for grade 2 scores would represent about two months of schooling in a ten-month school year.

Comparing provinces (or schools or districts) on this basis is preferable to reporting the rank order of provincial scores, because on many measures of achievement the average scores for most provinces are tightly clustered around the national mean. Thus, even a small error in the estimation of a province's score (stemming, for example, from sampling or test-measurement error) could dramatically affect the province's rank order. The use of effect sizes does not change the rank order, and it provides a means for judging the substantive importance of any observed differences among provinces. Many contemporary reviews of the academic literature summarize findings in terms of effect sizes.¹ For example, a reduction in average class size by five pupils is associated with an effect size of about 0.10, or 10% of 1 standard deviation.^{2,3}

References

1. Hattie, J. A. 1992. "Measuring the effects of schooling." *Australian Journal of Education*, 36: 5–13.
2. Levin, H. M., G. V. Glass and G. R. Meister. 1984. "Cost-effectiveness of four educational interventions." Project Report No. 84-A11. Stanford (CA): Stanford University, Institute for Research on Educational Finance and Governance.
3. Willms, J. D., and A. C. Kerckhoff. 1995. "The challenge of developing new social indicators." *Educational Evaluation and Policy Analysis*, 17: 113–1431.

Appendix 2. Sample sizes

The following table shows the sample sizes and the mean scores and standard deviations on the measures of household income, years of education of the PMK, and socioeconomic status. These are based on data for the full NLSCY sample of children.

The cohort completing the PPVT comprised more than 3,000 children, and those completing the mathematics tests for grades 2, 4 and 6 comprised 838, 859 and 732 children respectively.* Consequently, provincial estimates pertaining to mathematics scores are not as precise as estimates for the PPVT. In interpreting provincial estimates, one must consider carefully their standard errors, which indicate the extent of inaccuracy that could stem from sampling error.

In all studies, estimates of relationships among variables or comparisons among subunits (such as provinces) can be biased because of non-response. In most educational surveys, males are less likely to participate than females, and children from lower-SES families are less likely to participate than children from higher-SES families. In this study, the overall response rate for the mathematics test was

48.2%, and response rates varied for children with differing family backgrounds (for more detail on response rates, see the *NLSCY User's Guide*).

Generally, non-response will yield estimates of relationships among variables that are biased downward. Thus, the estimates of the effects of family background may be slightly weaker than would be expected if data for all children in the sample had been obtained. Comparisons among provinces in their average mathematics scores could be biased considerably if non-response rates for children with differing characteristics and family backgrounds varied among provinces. However, this bias is largely accounted for by controlling for children's background. The estimates calculated in this study would be biased if, given children with similar characteristics and family background, the likelihood of responding varied among provinces and depended on the child's ability in mathematics. There is no reason to suspect that this was the case.

* Data were also collected from children in grades 3 and 5. However, because an unacceptably large proportion of children scored at or near the ceiling of the tests for these grades, the data were not used in this research paper.

Table 1. Characteristics of the NLSCY sample

Province	n	Household income (\$1,000s)		Education of PMK (years)		Socioeconomic status	
		Mean	SD	Mean	SD	Mean	SD
Newfoundland	1,232	39.5	26.7	11.5	2.2	-.46	.83
Prince Edward Island	764	38.6	22.2	12.2	2.0	-.30	.70
Nova Scotia	1,532	42.3	26.1	12.5	2.3	-.17	.82
New Brunswick	1,426	40.6	22.9	12.2	2.1	-.25	.75
Quebec	4,065	46.7	27.9	12.2	2.5	-.15	.83
Ontario	6,020	53.3	31.1	12.8	2.3	.32	.76
Manitoba	1,789	46.0	28.9	12.1	2.3	-.19	.80
Saskatchewan	1,878	43.9	27.3	12.3	2.0	-.18	.72
Alberta	2,185	52.4	30.3	12.5	2.2	.96	.75
British Columbia	1,940	52.6	31.5	12.5	2.1	.14	.75
CANADA	22,831	49.9	29.9	12.5	2.3	-.61	.79

Source: NLSCY

Appendix 3. The effects of family background

Table 2 shows the relationships between the PPVT and mathematics test scores and the student background variables. The estimates are coefficients derived from multiple regression analyses. In each case, the coefficient denotes the expected change in the outcome measure for a one-unit change in the explanatory variable (i.e., student background variable), given that all other explanatory variables are held constant. Those coefficients marked ^a are statistically significant at the .05 level; that is, it is unlikely (less than 5 times in 100) that the observed relationship occurred by chance alone. Each column also includes a constant, which in all cases is close to zero because our data were standardized nationally to have a mean of zero.

PPVT

The first column shows the relationships for the PPVT scores. The coefficient for girls is 0.040, and is not statistically significant. Thus we can conclude that boys and girls scored equally well on the test.

The effect of years of education of the mother is 0.065, which is statistically significant. This indicates that, on average, PPVT scores increased about 6.5% of a standard deviation for each

additional year of education of the mother, with all other variables in the model held constant. The effect of the father's level of education was also statistically significant, but only about one-quarter as large. Thus, we can conclude that the mother's level of education has a much stronger effect on a child's verbal ability than does the father's level of education. On the other hand, the prestige of the father's occupation had a strong and statistically significant relationship with PPVT scores.

Household income was also significantly related, but the effect was relatively small at 0.002. This indicates that with other factors held constant, each additional \$1,000 in annual household income was associated with an increase of one-fifth of 1% of a standard deviation.

PPVT scores were negatively related to the number of brothers and sisters a child had. On average, each additional sibling was associated with a decrease in PPVT scores of about 10% of a standard deviation.

Finally, the PPVT scores for children living in single-parent families were, on average, about 20% of a standard deviation lower than the scores of children in two-parent families.

Table 2. Relationship between children's PPVT and mathematics scores and their family-background characteristics

	PPVT		Mathematics					
			Grade 2		Grade 4		Grade 6	
	1	2	1	2	1	2	1	2
Constant	-.004	.019	.031	.037	-.016	.017	-.029	-.034
Girls	.040	.045	-.239 ^a	-.273 ^a	.101	.075	.259 ^a	.236 ^a
Socioeconomic status		.343 ^a		.198 ^a		.227 ^a		.216 ^a
Education: mother	.065 ^a		.074 ^a		.075 ^a		.022	
Education: father	.017 ^a		.001		.003		.013	
Occupation: mother	-.007		.012		-.013		-.073	
Occupation: father	.091 ^a		.033		-.034		.171	
Household income	.002 ^a		-.001		.005 ^a		.002	
Single parent	-.197 ^a		-.327 ^a		.050		.035	
Number of siblings	-.092 ^a		.025		.071		-.074	

^a Statistically significant at the .05 level.

Source: NLSY

The results presented in the second column include only sex and the composite measure of socioeconomic status in the model. The estimate of sex differences, as in the full model, was not statistically significant. The estimate for SES, which can be considered the SES gradient, is 0.343. This suggests that for each standard deviation increase in SES, PPVT scores are, on average, about 34% of a standard deviation higher. This is not a particularly steep gradient; in statistical terms, the measure of SES explains less than 10% of the variation in PPVT scores.

Mathematics scores

The third, fifth and seventh columns of Table 2 present the regression estimates for the mathematics tests at each grade level, based on the full model. At the grade 2 level, girls scored

about 24% of a standard deviation (over two months of schooling) lower than boys (statistically significant, $p < .05$), but by grade 4, girls' scores were 10% of a standard deviation higher (about one month of schooling, but not statistically significant), and by grade 6 the gap was 26% of a standard deviation (about two-and-a-half months of schooling).

The fourth, sixth, and eighth columns replace the detailed measures of family background with the SES composite. The SES composite was a statistically significant predictor of mathematics scores at each grade level, but the gradients were also quite shallow – they ranged from 0.20 to 0.23. These are much smaller than the gradients estimated for many other countries, which range from about 0.4 to 0.5.

Appendix 4. Differences among provinces

Table 3 shows the estimates of achievement levels for each province. These are *adjusted estimates*: they indicate how well a child of nationally average SES (i.e., average household income and average levels of parental education and occupational prestige) scored in each province. Because the sample sizes within each province were fairly small, the error associated with sampling is fairly large.

The figures in brackets are the standard errors of the estimates; they indicate how precisely the adjusted averages were estimated. (The 95% confidence interval is given by the estimate plus and minus two times its standard error. If repeated samples were selected from the population under similar conditions, and 95% confidence intervals were constructed, they would contain the true value of the estimate 19 times out of 20).

PPVT

The first column of Table 3 shows the SES-adjusted estimates of PPVT averages. They indicate how well a child with nationally average family background characteristics scored on the PPVT in each province. The provincial averages ranged from -0.094 (Ontario) to 0.254 (Newfoundland). Five of the ten provinces had estimates that were more than 10% of a standard deviation above the national

average. An effect size of 10% of a standard deviation is reasonably large in substantive terms: a child scoring 10% of a standard deviation below the national mean would on average rank 47th out of every 100 children in Canada, whereas a child scoring 10% above the national mean would, on average, rank 53rd out of 100 children in Canada.

Mathematics scores

The SES-adjusted mathematics scores were more variable; they ranged from -0.205 (Ontario) to 0.390 (Quebec) for grade 2; -0.278 (Manitoba) to 0.608 (Quebec) for grade 4; and -0.396 (Ontario) to 0.648 (Quebec) for grade 6. Note, however, that the standard errors are larger for the estimates of adjusted mathematics scores than they are for the estimates of PPVT adjusted scores. Nevertheless, there were statistically significant differences among the provinces in their adjusted mathematics scores.

At the grade 2 level, only one province — Ontario — scored more than 10% of a standard deviation (about one month of schooling) below the national average. The score for Ontario was significantly different from the five highest-scoring provinces which had SES-adjusted scores that were more than 10% of a standard deviation (about

Table 3. Differences among provinces in their adjusted PPVT and mathematics scores*

Province	PPVT		Mathematics					
			Grade 2		Grade 4		Grade 6	
Newfoundland	.254	(.084)	-.092	(.142)	.301	(.130)	-.084	(.123)
Prince Edward Island	.053	(.085)	.092	(.239)	-.001	(.134)	.247	(.150)
Nova Scotia	.243	(.061)	.172	(.239)	-.213	(.127)	-.001	(.145)
New Brunswick	.008	(.067)	.100	(.161)	-.095	(.149)	-.112	(.128)
Quebec	.120	(.039)	.390	(.094)	.608	(.076)	.648	(.101)
Ontario	-.094	(.034)	-.205	(.067)	-.119	(.065)	-.396	(.069)
Manitoba	.008	(.061)	.115	(.121)	-.278	(.156)	-.125	(.118)
Saskatchewan	.183	(.055)	-.049	(.125)	-.157	(.139)	.016	(.122)
Alberta	.119	(.049)	-.045	(.103)	-.131	(.100)	.111	(.112)
British Columbia	-.068	(.064)	.378	(.095)	.081	(.111)	.265	(.101)

* Provincial estimates are less reliable due to high sampling variability.

Note: Results are expressed as effect sizes with the national average.

Source: NLSYC

one month of schooling) above the national average.

At the grade 4 level, the SES-adjusted scores for Quebec were remarkably high: 60.8% of a standard deviation (about six months of schooling) higher than the national average. The scores for Quebec were significantly higher than those of all other provinces. Newfoundland's SES-adjusted score was also high and was significantly different from the scores for the six provinces that scored below the national average. The estimates for the four provinces with the lowest scores were relatively imprecise. Their SES-adjusted scores were significantly different from Newfoundland and Quebec, but not significantly different from the national average.

Quebec also had the highest scores at the grade 6 level and its scores were significantly higher than those of all other provinces. The scores for the other provinces can be divided into three clusters. British Columbia and Prince Edward Island had SES-adjusted scores that were about 25% of a standard deviation (two-and-a-half months of schooling) above the national average. The scores for this cluster were significantly different from Ontario, which formed the lowest-scoring cluster. Ontario's SES-adjusted score was 40% of a standard deviation (about four months of schooling) below the national average. The SES-adjusted scores of Manitoba, New Brunswick, Newfoundland, Nova Scotia and Saskatchewan were in the middle of the distribution.

What Do We Know about Children from Single-mother Families?

Questions and Answers from the National Longitudinal Survey of Children and Youth

Ellen L. Lipman, David R. Offord and Martin D. Dooley

Families headed by single mothers are a large and growing population in Canada. This group of families is heterogeneous in that it includes mothers who have never married, women who are single parents due to the dissolution of a common-law or marital relationship, and women who are single parents due to death of a partner. However, many single-mother families share a disadvantaged status in that they have low income, low education, and are at increased risk of physical and mental health problems.^{1,2,3}

Children who grow up in single-mother families are exposed to the stresses commonly encountered in these families, such as poverty. It has been repeatedly demonstrated that poor children have significantly more psychosocial problems (such as emotional and behavioural problems and difficulties at school) than children who are not poor,⁴ and that these problems are not necessarily resolved as they grow up.⁵ There may also be additional stresses on child well-being and development due to divorce, for example.

Studies done in Canada and internationally have consistently shown that children from single-mother families are at increased risk of physical and mental health problems and social and academic difficulties.⁶⁻¹⁰ For example, Munroe Blum et al⁶ examined child psychiatric disorder and poor school performance among Ontario children aged 6 to 16 from single-parent families. The authors found that children from single-parent families (almost exclusively female-headed) had significantly higher rates of emotional and behavioural problems and academic difficulties than children from two-parent families. Longitudinal

follow-up of the 6- to 12-year-old Ontario children four years later revealed that single-mother family status was a strong and significant predictor of psychiatric and academic problems.⁷

How can we use the National Longitudinal Survey of Children and Youth (NLSCY) to increase our understanding of how children from single-mother families fare? The cross-sectional data from Cycle 1 of the NLSCY provide a snapshot view of children from single-mother families in Canada, as well as an opportunity to examine the following issues:

- the prevalence or proportion of children living in single-mother families in Canada;
- misconceptions and facts about adjustment of children from single-mother families;
- the relationship between income and adjustment among children in single-mother families.

A better understanding of these issues, gained through analysis of these national data, has an important role to play in planning policies and programs for this population of children.

Methodology

The methodological details of Cycle 1 of the NLSCY have been outlined in the Technical Appendix at the end of this publication. Methodological issues specific to this article only will be discussed here.

Respondent

The primary respondent in the NLSCY is the household member most knowledgeable about the child (PMK). In 90.3% of cases, the PMK was the mother. Only data obtained from mothers are used in this article.

Variables

Sociodemographic and Family (Independent) Variables

A family was classified as a single-mother family if the child was living with a biological, step, adoptive or foster mother who had no spouse or common-law partner living in the household. Only single-mother families in which the mother was the PMK were selected for this analysis. This excluded a very small number of single-mother families (2%) in which someone other than the mother was the PMK (for example, the grandmother of a child whose very young mother was living with her parents).

We decided to exclude single-father families because there were so few of them (only 7.3% of single parents were fathers) and because single fathers' incomes are much closer to those of two-parent families than single mothers'.¹¹

The comparison group was families in which a child was living with two parents and in which the PMK was the mother.

A child was defined as being 4 to 11 years old or 6 to 11 years old, depending on the availability of data for the outcome (dependent) variable of interest. Where data were available for 4- to 11-year-olds, a young child was defined as 4 to 7 years old, and an old child was defined as 8 to 11 years old. Where data were available for 6- to 11-year-olds only, a young child was defined as 6 to 7 years old, and an old child was 8 to 11 years old.

A low income level* was defined as household income that was equal to or less than the Statistics Canada low income cut-off (LICO).¹² This definition of low income was used instead of an income level expressed in dollars since the LICO corrects for both family size and place of residence. The non-poor group comprised families whose household income was above the LICO.

Outcome (Dependent) Variables

Child outcome was examined in the areas of emotional and behavioural functioning, academic functioning and social functioning. The selection of this range of child outcomes was guided by knowledge about the multiple components of healthy child development,¹³ previous research studies examining child psychosocial health^{14,15} and the availability of variables in the NLSCY.

Table 1 lists the symptoms used in the NLSCY for each of the emotional and behavioural difficulties reported by the mother and studied here: hyperactivity, conduct disorder and emotional disorder. Briefly, *hyperactivity* is characterized by inattention, impulsivity and motor activity; *conduct disorder* is characterized by either physical violence against persons or property or a severe violation of societal norms; and *emotional disorder* is characterized primarily by feelings of anxiety and depression. *One or more behavioural problems* is defined as one or more of hyperactivity, conduct disorder or emotional disorder.

The measurement of each of these disorders was guided by pre-existing scales.^{14,16} Thresholds to distinguish the presence or absence of individual disorders were set by summing the responses to individual items (1 = "sometimes or somewhat true;" 2 = "often or very true") and setting a threshold at which 10% of the children scored above the threshold; these children were said to have the disorder. These thresholds were based on knowledge about the prevalence of child psychiatric disorder gained from previous epidemiologic studies.¹⁷ Each of these variables was available for children 4 to 11 years of age.

In the area of academic functioning, *ever repeated a grade* is defined exactly as stated. A child is said to have *current school problems* when his or her mother rated the child's current overall school performance as "poor" or "very poor." These educational variables were available for children aged 6 to 11 only.

In the area of social relationships, *social impairment* means that the child had frequent or constant problems getting along with other children (such as friends or classmates), teachers and parents over the last six months. This variable was available for children aged 4 to 11.

* For data quality information regarding income levels, see "Income Ratio" in the Glossary of the Technical Appendix.

Table 1. Symptoms of conduct disorder, hyperactivity and emotional disorder used in NLSCY

Conduct disorder	Hyperactivity	Emotional disorder
<ul style="list-style-type: none"> Destroys his/her own things Gets into many fights Destroys things belonging to his/her family or other children When another child accidentally hurts him/her (such as bumping into him/her), assumes the child meant to do it, then reacts with anger and fighting Physically attacks people Threatens people Is cruel, bullies or is mean to others Kicks, bites, hits other children When mad at someone, tries to get others to dislike that person When mad at someone, says bad things behind the other's back When mad at someone, tells the other one's secrets to a third person Steals at home Vandalizes Steals outside the home 	<ul style="list-style-type: none"> Can't sit still, is restless or hyperactive Fidgets Is distractible, has trouble sticking to any activity Can't concentrate, can't pay attention for long Is impulsive, acts without thinking Has difficulty awaiting turn in games or groups Cannot settle to anything for more than a few moments Is inattentive 	<ul style="list-style-type: none"> Seems to be unhappy, sad or depressed Is not as happy as other children Is too fearful or anxious Is worried Cries a lot Is nervous, high-strung or tense Has trouble enjoying him/herself

Source: NLSCY

Total problems means that the child had one or more of the following: one or more behavioural problems, ever repeated a grade or social impairment. This variable was restricted to 6- to 11-year-olds, since the academic information was available for this group only.

Questions and Answers

How many children in Canada live in single-mother families?

In the sample we used for this paper, 16.3% of children were living in single-mother families and 83.7% of children were living in two-parent families. These results are similar to those obtained using Statistics Canada data which show that approximately one in six children is from a single-parent family.¹¹ Weighted estimates to represent the Canadian population result in 457,659 children 4 to 11 years old living in single-mother families and 2,358,500 children 4 to 11 years old residing in two-parent families.

Do most children with emotional and behavioural problems or school or social problems come from single-mother families?

Analysis of the data on children in our sample shows that, contrary to popular opinion, most children with difficulties, either emotional or beha-

vioural, academic or social, did not come from single-mother families, as shown in Table 2. Table 2 is organized to show the type of problem experienced by the child in the first column, the overall rate of problems among all children in the second column, and the contribution to the prevalence rate by children in single-mother families and in two-parent families in the third and fourth columns, respectively.

The overall prevalence of individual behaviour problems across family types ranged from 3.1% for social impairment to 10.5% for hyperactivity. Irrespective of family type, approximately one in five (20.8%) children had one or more behavioural problems and more than one in four (26.4%) had one or more problems in either the emotional and behavioural, academic or social areas.

When the contribution to the prevalence rate is examined by family type, most of the children with problems came from two-parent families, not from single-mother families. For example, the overall rate of conduct disorder for children across family types was 9.6%; slightly more than one-quarter (28.9%) of the children came from single-mother families and almost three-quarters (71.1%) came from two-parent families. While it is important also to note that most children lived in two-parent families, most children with emotional and

Table 2. Rates of problems overall and by family type

Type of problem	Overall rate % (n) ^a	Contribution to prevalence rate by family type (%)	
		Single-mother (n) ^a	Two-parent (n) ^a
Hyperactivity	10.5 (291,052)	23.9 (69,480)	76.1 (221,573)
Conduct disorder	9.6 (254,444)	28.9 (73,659)	71.1 (180,786)
Emotional disorder	8.7 (240,919)	27.9 (67,205)	72.1 (173,714)
One or more behaviour problems	20.8 (556,354)	24.7 (137,460)	75.3 (418,894)
Repeated a grade ^b	5.7 (114,314)	31.7 (36,288)	68.3 (78,026)
Current school problems ^b	3.2 (64,932)	29.0 (18,862)	71.0 (46,120)
Social impairment	3.1 (76,449)	32.8 (25,105)	67.2 (51,344)
One or more total problems ^b	26.4 (510,610)	25.2 (128,895)	74.8 (381,715)

^a Weighted estimates to reflect national population of children.^b Data available for 6- to 11-year-old children only. All other variables use data from 4- to 11-year-old children.

Source: NLSCY

behavioural problems came from two-parent families. It is important, therefore, that any programs aimed at helping children with emotional or behavioural problems or social or academic difficulties not be aimed solely at children from single-mother families but at children from all types of families.

Do most children of single mothers have emotional or behavioural problems or academic or social difficulties?

Some people believe that most children from single-mother families have problems with behaviour, in school or with making friends but Table 3 shows that this was not the case in our sample. Table 3 is organized to show the type of problem experienced by the child in the first column, the rates of children from single-mother families with the problem in the second column, and the rates of children from

single-mother families without the problem in the third column.

For all types of problems, the majority of children from single-mother families did not have problems. For example, approximately one in six (15.6%) children from single-mother families was hyperactive, so this means that five in six (84.4%) children from single-mother families were *not* hyperactive. Over two-thirds (68.3%) of children from single-mother families had none of the three behavioural problems measured. Four of ten (40.6%) children from single-mother families had one or more behavioural, academic or social problems (total problems), but even in this category most of the children from single-mother families had none of the problems studied. The consistent finding is that most of the children from single-mother families did not have the problems reported in this article.

Table 3. Proportion of children from single-mother families who have problems

Type of problem	Rates of children from single-mother families (%)	
	With problem	Without problem
Hyperactivity	15.6	84.4
Conduct disorder	17.2	82.8
Emotional disorder	15.0	85.0
One or more behaviour problems	31.7	68.3
Repeated a grade ^a	11.2	88.8
Current school problems ^a	5.8	94.2
Social impairment	6.1	93.9
One or more total problems ^a	40.6	59.4

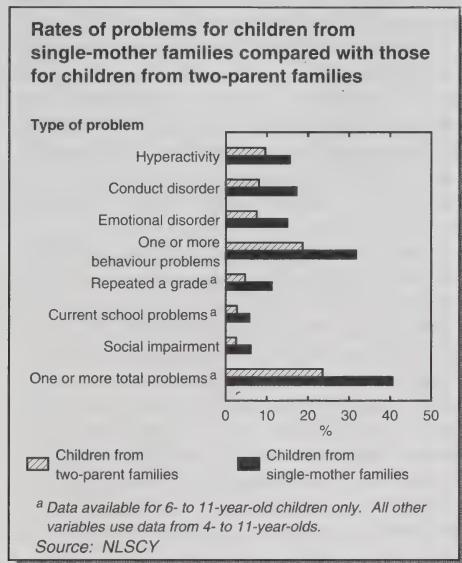
^a Data available for 6- to 11-year-old children only. All other variables use data from 4- to 11-year-old children.

Source: NLSCY

Are children from single-mother families at greater risk of emotional and behavioural problems or academic or social difficulties than children from two-parent families?

Figure 1 illustrates the prevalence of difficulties among the children from single-mother families compared with the children from two-parent families.

Figure 1



As can be seen in Figure 1, children from single-mother families had higher rates of difficulties than children from two-parent families for all of the emotional and behavioural problems and academic and social difficulties examined, and the differences in these rates were all statistically significant (see Appendix 1 at the end of this paper for details).

The finding of higher rates of problems among children from single-mother families than among children from two-parent families was true for both boys and girls.[†] Boys had higher rates of problems than girls regardless of family type. The pattern of higher rates of problems among children from single-mother families than among children from two-parent families holds whether the child is young or old.[†] Furthermore, some disorders had similar rates among both younger and older children (i.e., hyperactivity and conduct disorder), while other disorders (emotional disorder, one or more behaviour problems, social impairment, and repeating a grade) had increased rates with increasing age.[†]

Are children from single-mother families at greater risk of emotional or behavioural problems or academic or social difficulties than children from two-parent families whether the family is poor or not?

Many single-mother families must cope with low income. Using NLSCY Cycle 1 data for 4- to 11-year-old children, the average income of a two-parent family was \$56,643. The average household income of a single-mother family was \$22,058, less than half (38.9%) that of a two-parent family. The proportions of children from single-mother families and from two-parent families in the low-income and non-low-income categories are shown in Figure 2. Close to three-quarters (71.0%) of children from single-mother families in this sample lived at or below the Statistics Canada low income cut-off. Only 16.4% of children from two-parent families lived at or below this cut-off.

Figure 2

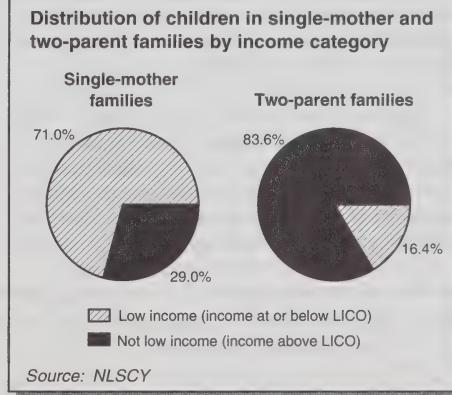


Table 4 shows the rates of problems in children from single-mother families and two-parent families broken down by income. The table shows the type of problem in the first column, the rates of problems among children from low-income single-mother families and low-income two-parent families in columns two and three respectively, and the relative odds of a problem occurring in children from single-mother families compared with children from two-parent families (see Appendix II at the end of this paper for an explanation of relative odds). For example, the rate of hyperactivity among children from low-income single-mother families was 16.7%,

[†] Data are not shown here but can be obtained from the authors on request.

while the rate of hyperactivity among children from low-income two-parent families was 9.6%. The odds of a child from a low-income single-mother family having hyperactivity were almost two times that of a child from a low-income two-parent family (relative odds = 1.89); this represents a statistically significant difference. Columns five, six and seven show the rates of problems among children from single-mother families with a non-low income, the rates of problems among children from two-parent families with a non-low income, and the relative odds of a problem occurring. Continuing the same example, the rate of hyperactivity among children from non-low-income single-mother families was 13.7%, and the rate of hyperactivity among children from non-low-income two-parent families was 9.6%. The odds of a child from a non-low-income single-mother family having hyperactivity was about one and a half times that of a child from a non-low-income two-parent family (relative odds = 1.49), a statistically significant difference. For all the types of problems studied, it appears that children of single mothers were at increased risk of emotional and behaviour problems whether or not the family was poor.

Table 5 summarizes the strength of association between the two risk indicators — single-mother family status and low income — and childhood problems. In each instance, the reported strength of association between the risk indicator and childhood problems is over and above the effects

of the other risk indicator. In Table 5, the risk indicators are in column one, and the strength of association between the risk indicators and the various problems is shown in columns two, three, four, and five. For example, the likelihood of a child from a single-mother family having one or more behaviour problems was 1.8 times that of a child from a two-parent family — a significant difference even controlling for income differences between these two family types. The odds of a child from a low-income family having one or more behaviour problems was 1.2 times that of a child from a non-low-income family, which also represents a significant difference regardless of family type. This analysis confirms that both single-mother status and low income have a significant, independent relationship with multiple problems and are important risk indicators for childhood problems.

The limitations of the NLSCY Cycle 1 data must be noted. The data are cross-sectional (i.e., they are taken at one time only) and so produce a snapshot of problems experienced by children in various types of families. This is problematic since some children are temporarily in a single-mother (or two-parent) family, and some are temporarily in a low-income (or non-low-income) family. The duration of single-mother status and the depth and duration of low income most likely plays an important role in the prevalence and severity of the childhood problems we have studied. The associations (or lack of associations) between the

Table 4. Rates of problems for children from single-mother families compared with those of children from two-parent families, by income

Type of problem	Rates of problems by income (%)					
	Low income			Not low income		
	Single-mother	Two-parent	Relative odds ^a	Single-mother	Two-parent	Relative odds ^a
Hyperactivity	16.7	9.6	1.89	13.7	9.6	1.49
Conduct disorder	19.2	9.2	2.35	13.2	7.9	1.77
Emotional disorder	16.7	8.6	2.13	11.6	7.3	1.67
One or more behaviour problems	33.5	21.0	1.90	27.9	18.3	1.73
Repeated a grade ^b	12.5	7.9	1.67	9.1	4.1	2.34
Social impairment	7.4	4.6	1.66	3.8	2.1	1.84
One or more total problems ^b	43.5	28.9	1.89	35.8	22.6	1.91

Income categories: Low income = Income \leq LICO

Not low income = Income $>$ LICO

^a $p < .001$. See Appendix 2 for the definition of relative odds.

^b Data available for 6- to 11-year-old children only. All other variables use data from 4- to 11-year-old children.

Source: NLSCY

Table 5. Strength of association between risk indicators and problems using logistic regression

Risk indicator	Relative odds ^a for problems			
	One or more behaviour problems	Repeated a grade ^b	Social impairment	Total problems ^b
Single mother	1.82 ^c	1.95 ^c	1.73 ^c	1.90 ^c
Income ≤ LICO	1.22 ^c	1.79 ^c	2.16 ^c	1.39 ^c

^a See Appendix 2 for the definition of relative odds.

^b Data available for 6- to 11-year-old children only. All other variables use data from 4- to 11-year-old children.

^c $p < .001$

Source: NLSCY

risk indicators and childhood problems reported here reflect only the family or income status at the time of data collection. Information in the second release of Cycle 1 data will make it possible to analyse in more detail a child's family and custody history (such as how long and when he/she had been living in a single-mother family). This will allow a more accurate estimate of the association between this risk indicator and childhood problems. Income information from future cycles of the NLSCY will provide more information about the effects of both transient and persistent low-income status. Clearly, longitudinal data (data collected at multiple points in time) are necessary to understand more accurately the mechanism through which single-mother status and other risk indicators, such as low income, influence childhood emotional and behavioural problems and social and academic difficulties.

Conclusions

1. Approximately one in six children in the NLSCY sample was living in a single-mother family.
2. The children from single-mother families were at increased risk of a range of difficulties compared with children from two-parent families. These difficulties included emotional and behavioural problems and academic and social difficulties. However, the majority of children from single-mother families did not have these problems and most children with these problems came from two-parent families. Clearly, programs aimed at helping children with emotional and behavioural problems and social and academic difficulties must be aimed at children from all types of families.

3. Children from single-mother families were more likely to be poor than children from two-parent families. The average income of a single-mother family in the NLSCY was less than half that of a two-parent family. These children were undoubtedly vulnerable to the risks to child well-being associated with poverty.
4. Being the offspring of a single mother placed a child at increased risk of emotional or behavioural problems or academic or social difficulties, whether the family was poor or not.
5. Both single-mother family status and low income significantly and independently influenced child well-being. Strategies to improve the psychosocial health of children from single-mother families should include income support but this will not suffice. As the causal pathways through which single-mother status influences childhood well-being become better known, so will our understanding of which non-economic interventions are most likely to help.
6. Future cycles of the NLSCY will provide longitudinal data that will enrich our scientific understanding of how children from single-mother families fare. Specifically, analysis of the new data will reveal the distribution of strengths and problems within this subpopulation as well as the causal pathways through which single-mother family status and other risk factors, such as low income, influence childhood problems. The longitudinal data will also help policy makers select those economic and non-economic interventions which most effectively promote healthy child development.

References

1. National Council on Welfare. 1995. *Poverty Profile 1993*. Ministry of Supply and Services, Ottawa, Ontario.
2. Avison, W.R., and C. F. Thorpe. 1993. Family structure and maternal mental health: single parenthood and other risk factors. Paper presented at the 1993 American Public Health Association Annual Meeting, San Francisco, CA.
3. Weissman, M., P. Leaf and J. L. Bruce. 1987. "Single-parent women." *Social Psychiatry*, 22: 29-36.
4. Lipman E. L., D. R. Offord and M. H. Boyle. 1994. "Economic disadvantage and child psychosocial morbidity." *Canadian Medical Association Journal*, 151: 431-437.
5. Rutter, M. 1992. "Adolescence as a transition period: continuities and discontinuities in conduct disorder." *Journal of Adolescent Health*, 13: 451-460.
6. Munroe Blum, H., M. H. Boyle and D. R. Offord. 1988. "Single-parent families: child psychiatric disorder and school performance." *Journal of the American Academy of Child and Adolescent Psychiatry*, 27: 214-219.
7. Lipman, E. L., and D. R. Offord. 1995. "Psychosocial morbidity among poor children in Ontario." In *Consequences of Growing Up Poor*. Edited by G. Duncan and J. Brooks-Gunn. Russell Sage Foundation (in press).
8. Judge, K., and M. Benzeval. 1993. "Health inequalities: new concerns about the children of single mothers." *British Medical Journal*, 306: 677-680.
9. Kellam, S. G., M. E. Ensminger and J. Turner. 1977. "Family structure and the mental health of children. Concurrent and longitudinal community-wide studies." *Archives of General Psychiatry*, 34: 1012-1022.
10. Moilanen, I., and P. Rantakallio. 1988. "The single parent family and the child's mental health." *Social Science and Medicine*, 27: 181-186.
11. Dooley, M. D. 1994. "Women, children and poverty in Canada." *Canadian Public Policy*, XX, 4: 430-443.
12. Statistics Canada. 1994. *Income Distributions by Size in Canada*. Statistics Canada Catalogue no. 13-207. Ottawa: Minister of Industry, p. 44.
13. Premier's Council of Health, Well-Being and Social Justice. 1994. *Yours, Mine and Ours: Ontario's Children and Youth*. Phase I. Toronto: Queen's Printer for Ontario.
14. Boyle, M. H., D. R. Offord, H. G. Hofmann et al. 1987. "Ontario Child Health Study: I. Methodology." *Archives of General Psychiatry*, 44: 826-831.
15. Offord, D. R., M. H. Boyle, Y. A. Racine et al. 1992. "Outcome, prognosis and risk in a longitudinal follow-up study." *Journal of the American Academy of Child and Adolescent Psychiatry*, 31: 916-923.
16. Achenbach, T., and C. Edelbrock. 1981. "Behavioral problems and competencies reported by parents of normal and disturbed children aged 4 through 16." *Monographs of the Society for Research in Child Development*, 46: 1-78.
17. Offord, D. R., M. H. Boyle, P. Szatmari et al. 1987. "Ontario Child Health Study: II. Six-month prevalence of disorder and rates of service utilization." *Archives of General Psychiatry*, 44: 832-836.

Appendix 1. Rates of problems for children from single-mother families compared with those for children from two-parent families

Type of problem	Children from single-mother family		Children from two-parent family		Relative odds ^b
	%	(n) ^a	%	(n) ^a	
Hyperactivity	15.6	(69,480)	9.6	(221,573)	1.74
Conduct disorder	17.2	(73,659)	8.1	(180,786)	2.36
Emotional disorder	15.0	(67,205)	7.5	(173,714)	2.18
One or more behaviour problems	31.7	(137,460)	18.7	(418,894)	2.02
Repeated a grade ^c	11.2	(36,288)	4.7	(78,026)	2.56
Current school problems ^c	5.8	(18,862)	2.7	(46,120)	2.22
Social impairment	6.1	(25,105)	2.5	(51,344)	2.53
One or more total problems ^c	40.6	(128,895)	23.6	(381,715)	2.21

^a Weighted estimates to reflect national population of children.

^b $p < .001$. See Appendix 2 for the definition of relative odds.

^c Data available for 6- to 11-year-old children only. All other variables use data from 4- to 11-year-olds.

Source: NLSCY

Appendix 2. Definition of relative odds

Relative odds is a measure of strength of association giving the odds of the outcome (e.g., hyperactivity) in the presence of a marker (here, single mother) as compared with the odds of the same outcome in the absence of a marker (here, not single mother).

For example, using row 1 from Appendix 1, the odds of hyperactivity for a child from a single-mother family is $15.6/84.4 = 18.48$ and the odds of hyperactivity for a child from a two-parent family is $9.6/90.4 = 10.62$, therefore, the relative odds is $18.48/10.62 = 1.74$. The probability that this difference has occurred by chance is less than 1 in 1,000.

Stories about Step-families

David Cheal

Diversity is a prominent feature of social life today — and of children's lives. Some children's lives are more complex than others because of the variety of family lifestyles and because some children experience frequent changes in family membership. One aspect of the social complexity of childhood is the growing number of children living in step-families.

Most step-families today are formed as a result of divorce followed by remarriage.¹ Long-term trends in marriage and divorce have played a major role in changing family structures since the 1960s. Divorce rates increased in recent decades, peaking in 1987,¹ and this trend was accompanied by growing numbers of remarriages.² Approximately one in five men and women marrying in the early 1990s had been previously married.³ Some of these remarriages involved children from a previous relationship. It has been estimated that in Canada in 1990 about 7% of all families currently raising children contained at least one stepchild.⁴

A step-family consists of a married or common-law couple residing in the same household with at least one stepchild who is the biological or adopted child of one parent but not of the other parent. Stepchildren's family lives are often complex, because they have different relationships with the adults whose home they share. Stepchildren have a direct relationship (biological or adoptive) with one resident parent, but an indirect relationship with the other resident parent (through remarriage or cohabitation). Furthermore, stepchildren may have

economic and social relationships with non-resident parents who have varying degrees of involvement in their lives.

An additional dimension of complexity can arise from sibling relationships within step-families. If the resident parents both have children from previous relationships living with them or have a biological/adopted child of the new marriage in addition to a stepchild, they have what is known as a blended family. Blended families comprise children who have different relationships with the resident parents. These differences may be reflected in the interaction between step-siblings.

Because of their complexity, step-family structures have the potential for interaction dynamics that differ from those found in intact families.⁵ As a result, step-family members may find that their family roles are complicated and confusing.⁷ Adjustment to step-family living may also be hindered by cultural stereotypes. Step-family dynamics have long provided the raw material for myths, legends and fairy tales which culturally transform and invert the story of normal family life. In these stories about step-families, the centre of the child's social world is not a mother's love but a stepmother's hatred.

The Stepmother Myth

Wicked stepmothers are some of the most frightening figures in traditional stories about children. Cinderella and Snow White are perhaps the best known victims of stepmothers. It is noteworthy that these famous stepchildren are both stepdaughters. This is no coincidence. The mythical victims of stepmothers are usually girls rather than boys.⁸ Stories about stepsiblings who suffer at the hands of their stepmothers are relatively rare.

¹ In addition to the formation of step-families through remarriage, a growing number of step-families are formed through cohabitation of common-law spouses, especially in Quebec. Cohabitation sometimes precedes remarriage, but it can also result in long-term common-law step-families.² Legal marriage and cohabitation have different consequences for family life, and diversity of marital status among step-families should therefore be taken into consideration in future analyses of stepchildren's experiences.

Folk tales about bad relationships between stepmothers and stepdaughters have been popular in a number of countries for many centuries.⁹ The first "Cinderella" story to be written down was recorded in China over one thousand years ago.¹⁰ Modern descendants of these stories still influence perceptions of step-families today. The invention of the printing press and, later, movies and cartoons has only expanded the audience for these ancient stories. Disney, in particular, popularized the story of Cinderella in the second half of the twentieth century.¹¹ Disney's romantic interpretation of the heroine's virtues led him to downplay the rivalry between Cinderella and her stepsisters. Instead, he stressed the power of the wicked stepmother over her helpless stepdaughter.¹²

All fairy stories about step-families are based on a simple, yet powerful, myth concerning family life. The stepmother myth consists of four main elements.

First, the child's mother (or stepmother) is portrayed as the central figure in family life. Access to food, clothes and shelter are all controlled by mothers, either directly or indirectly through their influence over fathers. By comparison, fathers appear to be passive to the point of being almost superfluous to the story: "the fathers of these fairy-tale figures are supremely passive or positively negligent when it comes to their children's welfare; they remain benevolent personages largely because benign neglect contrasts favourably with the monstrous deeds of their wives."¹³

Second, children are shown to be vulnerable to losing their mothers, normally through death which is often reported to occur in childbirth.

Third, tensions appear to be inevitable between children and their father's second wife, mainly because of the latter's aggression. Fairy-tale stepmothers are flawed mothers for two interconnected reasons. In the traditional tales, mothers demonstrate a strong preference for their biological children over unrelated stepchildren. Also, stepmothers seem to treat stepdaughters like sexual rivals, either to themselves in their own struggles for male affection, or to their biological daughters in competition for the most eligible husbands.

Fourth, families comprising children from the previous unions of both parents are frequently described to be divided by rivalries between step-

siblings. In the mythical world of fairy tales, material resources such as fine clothes are presented as scarce goods which children seek to monopolize for their own advantage. Generosity toward the children of one parent apparently results in deprivation of the children of the other parent.

The stepmother myth is an enduring component of "common-sense knowledge" about families. It is therefore worthwhile to submit it to social scientific scrutiny. Four main questions about family dynamics are raised by the stepmother myth.

First, the parental roles of mother and father are gender roles, and gender differences in parenting may have important effects on children. The stepmother myth suggests that gender is indeed important, perhaps because women have traditionally played the major role in child-rearing. Is gender still a major factor in parenting in the 1990s?

Second, there is the question of whether or not children are adversely affected by a history of unstable parenting. Unlike children in intact families, whose parents continue to live with them throughout childhood, stepchildren have experienced the disruption of one family through the loss of a parent and the reconstitution of another family through a new union by the surviving parent. Does instability in parenting make a difference to relationships between parents and children?

Third, it is sometimes suggested that the relationship between biological parents and their children is stronger and more protective than that between parents and children in "chosen" family configurations. Does the absence of a genetic link between parent and child make a difference, as some sociobiologists claim?¹³⁻¹⁶

Fourth, the well-being of children is affected not only by their parents, but also by their brothers and sisters. Are interactions between step-siblings more stressful than interactions between children born to or adopted into the original family? And do relationships among children affect relationships between children and parents?

Step-families in Social Research

Interestingly, the old myths about step-families appear to find some support from three small Canadian studies. In an exploratory study of 103

remarriages in Metropolitan Toronto, Anne-Marie Ambert¹⁷ found that stepmothers were often ambivalent toward stepchildren, especially if they also had a biological child from the new marriage. Charles Hobart¹⁸ reports from an unnamed Canadian city that in a snowball sample of 232 families which had been constituted by remarriage, husbands and wives had more positive relationships with their children from the new marriage than they had with the children from their previous marriages. Remarried wives were more positive toward their own children than toward their new spouse's children, although that was not true for remarried husbands. On the basis of this evidence, Hobart¹⁹ argues that there are likely to be first-class, second-class and third-class children in blended families. First-class children are those born to the remarried couple; the wife's earlier children are second-class; and the husband's earlier children are third-class. Finally, another exploratory study of 45 reconstituted families (*familles reconstituées*) in Quebec concluded that stepchildren's satisfaction with family functioning is greater when the custodial parent is the biological mother than when it is the biological father.²⁰

Reviews of American research on step-families report that the role of stepmother is more stressful than the role of stepfather.^{21,22} Girls are reported to have more difficulty in their relationships with step-parents than boys, especially with their stepmothers.²³ Stepmothers and stepdaughters appear to have more relationship difficulties than do stepfathers and stepsons, and stepmothers have been described as being more negative toward step-parenting than stepfathers.^{21,24,25}

However, in social analysis, it is always necessary to keep in mind the distinction between the incidence of behaviour in a group and inter-group comparisons of the distribution of that behaviour. The above findings are drawn from inter-group comparisons. However, they may not tell us much about the characteristics of step-parents as a group. Although research may show that parent-child relationships in step-families are more problematic than parent-child relationships in intact families, it is possible that only a minority of stepchildren actually experience serious interpersonal problems.²⁶ To put the point more directly, stepmothers may be less involved, on average, than biological mothers in emotionally rewarding interactions with children, but most stepmothers may still be doing a good job. We will

need to examine whether or not there is any evidence that the majority of stepchildren have unsatisfactory relationships with their step-parents.

Step-families in the NLSCY

The National Longitudinal Survey of Children and Youth (NLSCY) promises to be a major source of information about stepchildren and step-families in Canada, partly because the survey's sample size is so much larger than any comparable study's. Minority family types, such as step-families, can now be studied with greater accuracy. They can also be studied in more detail due to the inclusion of Statistics Canada's innovative relational grid in the NLSCY questionnaire. This grid establishes the relationship of everyone in the household to everyone else, including step-relationships. Of the 22,831 children studied in the NLSCY's first cycle of data collection in 1994–1995, 875 were stepchildren living with their biological/adoptive mother and stepfather, and 121 were stepchildren living with their biological/adoptive father and stepmother.

Table 1. Residential parenting arrangements

	All children	Children in step-families
Biological ^a mother and biological father	78.7	45.6
Biological mother and no father	14.4	n/a
Biological mother and stepfather	3.6	42.1
Biological father and no mother	1.1	n/a
Biological father and stepmother	0.7	8.0
Other parenting	1.4	4.3 ^b
No custodial parent	0.1	n/a
Total %	100.0	100.0

^a "Biological" parents include adoptive parents.

^b Estimate less reliable due to high sampling variability.

Source: NLSCY

Of children in Canada under age 12 surveyed in 1994–1995, 8.6% were living in a step-family.[†] Almost half of these children were actually stepchildren, while the others were born or adopted into step-families. Of children under age 12, 6.1% lived in a blended family in which at least one child

[†] The relative frequencies presented in this report use weighted data which give an accurate estimate of the population characteristics of children in Canada.

did not have the same biological or adoptive parents as the other child(ren). The most common type of blended family (to which 4.4% of all the children surveyed belonged) consisted of a couple and their shared children, together with the wife's children from a previous relationship.

Most stepchildren (3.6% of all children) lived with their biological/adoptive mother and a stepfather; very few stepchildren (0.7% of all children) lived with their biological/adoptive father and a stepmother. The stepmother myth described earlier clearly does not accurately describe the composition of step-families in Canada at the end of the twentieth century. Although the traditional stories focus attention exclusively on stepmothers, only one in five stepchildren lived with a female step-parent.

Table 2. Biological parent-child relationships in step-families

	%
Mother's biological ^a children plus couple's biological children	51.0
Mother's biological children only	25.5
Father's biological children plus couple's biological children	11.1
Mother's biological children, plus father's biological children, plus couple's biological children	4.6
Mother's biological children, plus father's biological children	3.9 ^b
Father's biological children only	3.4 ^b
Other	0.5 ^b
Total %	100.0

^a 'Biological' children include adopted children.

^b Estimate less reliable due to high sampling variability.

Source: NLSCY

In the past, stepmothers were undoubtedly more prevalent than they are now. Many mothers died young and therefore more children were raised by widowers. The second wives of those widowers were the wicked stepmothers in fairy stories. In Canada today, step-families are rarely formed as a result of the death of the biological mother. Rather, most are established following the divorce of the biological/adoptive parents. Since more than 70% of divorce-court decisions on child custody in recent decades have awarded sole custody to mothers,²⁷ most step-families today comprise a mother with her biological/adopted children and a stepfather.

Statistically, then, the definition of "stepmother" in traditional cultural myths no longer holds true. In

contrast, we do not have a clear picture of stepfathers, even though four of five step-parents today are men. Research into the validity of the stepmother myth needs to be balanced by a better understanding of the role of contemporary stepfathers.

The fascination of the stepmother myth lies in its exploration of a particular kind of step-family relationship, namely that between a stepmother and a stepdaughter. Clearly, if more step-families today have stepfathers than stepmothers, this particular relationship will be uncommon. Indeed, because of the uneven distribution of children between different kinds of step-families, it occurs even less frequently than we might think.

Table 3. Step-parent-stepchild relationships in step-families

	%
Stepfather-stepdaughter	39.6
Stepfather-stepson	37.8
Stepmother-stepson	8.4
Stepmother-stepdaughter	6.3
Unknown	8.0
Total %	100.0

Source: NLSCY

There was a slight tendency for children living with one biological/adoptive parent and one step-parent to live with the biological/adoptive parent of the same sex. Boys accounted for 57.1% of children living with their biological/adoptive father and stepmother, while 51.2% of children living with their biological/adoptive mother and a stepfather were girls. One consequence of the gendered distribution of children after divorce is that step-family dynamics are skewed in a direction opposite to that implied by the stepmother myth. The most common stepparenting relationship is the stepfather-stepdaughter relationship, followed by the stepfather-stepson relationship, and then by the stepmother-stepson relationship. The least common step-relationship is that between a stepmother and a stepdaughter. If the latter relationship is at all remarkable, it is mainly because the social recognition it receives is out of all proportion to its contemporary demographic significance.

Nevertheless, there is one very important reason why stepmothers receive so much more attention than stepfathers: the central role of women

in child-rearing and the practical invisibility of men. We saw earlier that this is a prominent feature of the stepmother myth. It is also a striking characteristic of the National Longitudinal Survey of Children and Youth.

In the NLSCY, information about children is mainly supplied by the person most knowledgeable about the child (PMK).[‡] In nine out of ten cases the person most knowledgeable about the child was a woman. Although stepfathers outnumbered stepmothers in the NLSCY by a ratio of 5 to 1, there were three times as many stepmothers as stepfathers who said that they were the person most knowledgeable about the child. As a result, the NLSCY data did not permit a detailed analysis of stepfathers' role in family interaction.

Children Aged 10 to 11 and Family Life

The validity of conventional stories about stepfamilies can be examined by comparing children in different family relationships according to the quality of their interactions with family members.[§] The main emphasis here will be on the relative frequency of children who experience extreme levels of stress in their family life.

The effects of family on children are best studied by using children's own reports of their lives. That is not so much because parents provide misleading information as it is because a parent's impression of a child's interaction with the family can differ from the child's own experience of it. If children believe their parents reject them, that will affect how children respond to their parents, regardless of what the parents themselves believe they do.

The NLSCY is designed to collect certain information from older children, starting at age 10. Before that age, all information is collected from adults, usually the PMK.

In Cycle 1 of the NLSCY, only children 10 to 11 years old filled in their own questionnaire. Consequently, only a limited amount of self-reported data from children is available; more of this type of data will be generated in future cycles. At present, the possibilities for social analysis are limited by the small number of relevant cases. The results reported here are therefore intended to be

exploratory only, and to indicate areas for future research.

Children's evaluations of their family interactions have been combined into several scales that identify particular dimensions of childhood social experience. Three dimensions are of special relevance here:

- difficulty of family relationships
- emotional support
- erratic punishment.^{**}

Each scale has been divided into three approximately equal categories (low, medium and high). In order to test conventional ideas about stepfamilies, the focus here will be on children who experience a high degree of difficulty in family relationships, a low level of emotional support, and high levels of erratic punishment.

Difficulty of family relationships was measured by asking children three questions about how well they had got along with their mother, their father, and their brothers and sisters during the previous six months.^{††} The *emotional support* scale comprises five items on how often children say their parents or step-parents make them aware of their positive feelings by smiling, praise and other signs of approval. *Erratic punishment* was measured by

[‡] The overwhelming majority of PMKs (88.1%) were the biological mothers of the children. Only 1.4% of PMKs were neither the mother nor the father of the child.

[§] Data on children under 2 years of age have been excluded from the present analysis. There are two distinct social phases of childhood, and information on infant children cannot easily be combined with data on older children. When children were less than 2 years of age, PMKs reported very high frequencies of positive interactions with them. From 2 years of age and up, PMKs reported much more variable interactions with children and fewer positive interactions on average. The loss of data by excluding infants is minimal for the purpose of studying stepfamily interactions. Less than 1% of infants lived with a step-parent, reflecting the demographic cycle of marriage, birth, divorce, and remarriage.

^{**} For the benefit of researchers who may be interested in analysing NLSCY data, the scales of the evaluations of family interactions made by children aged 10 to 11 can be identified in the data set as follows: "difficulty of family relationships" is labelled Getting Along (items A10 to A12 only were used here); "emotional support" is labelled Parenting Nurturance; and "erratic punishment" is labelled Parenting Rejection.

^{††} Readers should be aware of an interpretation problem arising from the survey questions about how well children aged 10 to 11 get along with their mother and father: in the case of stepchildren, it is impossible to be sure whether their answers refer to the step-parent or to the biological/adoptive parent. The assumption is made that the children are referring to the resident parent, i.e., the step-parent.

children's responses to six items dealing with such issues as parents' nagging, threats and hitting.

Comparisons of selected family relationships show that stepchildren reported more difficulties in family relationships, less emotional support and more punishment than children who lived with both of their biological/adoptive parents. This conclusion is based on three sets of comparisons.

First, children in intact families are compared with children in step-families. This comparison demonstrates the effect of stability versus change in family structure.

In the second comparison, children in all step-families are compared with children in blended families. This comparison shows whether or not the problems of children in step-families were concentrated in families where step-sibling rivalries exist.

A third comparison studies the effects of parenting by biological/adoptive mothers in three different family situations: 1) the biological/adoptive mother living with the biological/adoptive father; 2) the biological/adoptive mother living with a stepfather; and 3) the biological/adoptive mother living as a lone parent. This comparison also illustrates the effects of different kinds of fathering.

Children in Step-families

Children aged 10 to 11 years in step-families were more likely than children in intact families to say that they lack emotional support from their parents, but the difference was not large (32.7% compared with 26.6%). There were greater differences for erratic punishment and difficulty in getting along with parents and siblings. Of children in intact families, 33.4% said they experienced a high level of erratic punishment, but 42.8% of children in step-

families reported this. Similarly, 44.2% of children in step-families said they had a high level of difficulty in their family relationships, but this was so for only 28.2% of children in intact families. It is important to note that although children in step-families showed more dissatisfaction, the majority nevertheless had moderate to good experiences with parents. Children in step-families were distributed more or less equally across the three categories of low, medium and high emotional support. Interestingly, children in blended families were no more likely than children in other step-families to experience interpersonal problems.

Stepchildren with Stepfathers

As already noted, Cycle 1 of the NLSCY showed that the most common step-parenting arrangement was one in which the child lived with his or her biological/adoptive mother and the mother's new husband, who became the child's stepfather. Stepchildren in stepfather families reported having less satisfactory social experiences than children living with both biological/adoptive parents, although the difference in emotional support was small (7%). There was a large difference of 17.1% in frequency of very difficult family relationships, and an equally large difference of 16.8% in claims of very erratic punishment. Indeed, close to the majority (49.9%) of stepchildren in stepfather families said they were exposed to erratic levels of punishment.

Children in female-headed lone-parent families reported having great difficulty in family relationships, perhaps due to a lack of contact with the absent father.

Clearly, stepchildren aged 10 to 11 did not view their interactions with parents as favourably as children in intact families did. What is not so clear is whether this was due to the ways in which step-

Table 4. Selected residential parenting arrangements and negative perceptions of family life by children 10 to 11 years old

	Lack of emotional support	Erratic punishment	Difficult family relationships
Biological ^a mother and biological father	26.8%	33.1%	28.1%
Biological mother and no father	30.2%	34.2%	60.7%
Biological mother and stepfather	33.8%	49.9%	45.2%

^a "Biological" parents include adoptive parents.

Source: NLSCY

parents behave or due to the ways in which stepchildren relate to them.

Parents' Behaviour

In addition to self-reports collected from children aged 10 to 11, the NLSCY collected information from the PMKs who were parents about their actions toward all children. The nature of parent-child interactions, as seen by parents, can be described through scales that combine responses to three sets of questions. Each scale measures a particular dimension of the parent-child relationship. The three dimensions of the PMK's behaviour toward the child are:

- pleasurable interaction
- punishment for rule-breaking
- consistent use of sanctions.^{‡‡}

Once again, the scales can be divided into three levels (low, medium and high) in order to identify cases at the extremes.

Information on parenting is provided by the PMK, who is usually the biological/adoptive mother. For this reason, we will use mothers as the criterion group in the remainder of the analysis. Here, the NLSCY, by virtue of its design, has the advantage of over-representing stepmothers, thus providing enough cases to make it possible to study this small group (although the number of cases is still lower than desirable to result in fully reliable data).

Pleasurable Interaction

Stepmothers^{§§} were somewhat less likely than biological/adoptive mothers to have fun with children, such as playing or laughing together. While 27.7% of biological/adoptive mothers reported having only infrequent pleasurable interactions with their child, 34.4% of stepmothers rarely had fun with the child. This pattern perhaps reflects relationship difficulties in step-families rather than any unique characteristic of stepmothers. PMKs in

^{‡‡} Two dimensions of the PMK's behaviour toward the child that are described here correspond to the following scales in the NLSCY data set: "pleasurable interaction" is labelled Positive Interaction (2 to 11 years). In addition, an original scale was constructed on "punishment for rule-breaking" (items PARQ19, PARQ21, PARQ23 and PARQ25) that is not included in the NLSCY data set. "Consistent use of sanctions" is labelled Consistency of Interaction (2 to 11 years).

^{§§} Analysis related to stepmothers may often be based on an insufficient number of cases and therefore may not meet Statistics Canada's quality standards.

stepmother and stepfather families reported the same relative lack of pleasurable parent-child interaction.

Punishment

There was equal prevalence (about 40%) of biological/adoptive mothers and stepmothers who said they frequently punish their children for breaking rules. PMKs in stepfather families were more likely to practise frequent punishment (42.7%) than PMKs in stepmother families (36.8%). Although blended families as a whole did not have elevated punishment levels, punishment for rule-breaking was most common in blended families where both partners brought their own children from previous relationships into the new marriage (i.e., both are step-parents). Such families probably have multiple stresses, including financial strains, which some parents may find hard to handle. Nevertheless, it should be noted that even here half of PMKs reported that they punish children with only low or moderate frequency (51.4% practised frequent punishment).

Surprisingly, although PMKs in step-families reported relatively high levels of punishment, they did not say they used sanctions inconsistently. Variability of discipline did not seem to be a problem for step-parents, even in stepfather families, according to the PMK.

Mother Nature or Mother Nurture

There is no evidence here to support the traditional stepmother myth that stepmothers are harsher and more capricious toward stepchildren than biological/adoptive mothers are toward their biological/adoptive children. Some stepmothers did appear to have less fun parenting, however.

Discussion

The stepmother myth is a part of our culture which affects how people think about family relationships. The most potent mythical references concern the supposedly evil nature of stepmothers and the unbalanced relationships they are believed to have with their stepchildren, especially their stepdaughters. In Europe in the nineteenth century, observers were concerned about the effect these stories had on children, since it was feared that they created an unnecessary distrust of

stepmothers. Today we are also likely to be concerned about the effects on stepmothers themselves, who often refer to the fairy stories and their influence.²⁸ Clinical experience suggests that the evil stepmother stereotype has negative implications for stepmothers' identity management. New stepmothers may work too hard at mothering and then react to the inevitable disappointments with a sense of rejection followed by depression.^{29,30}

Some policy makers have recommended that researchers should support positive stepparenting by working to correct myths about stepmothers and step-family life.³¹

The idea that stepchildren are at greater risk for parental aggression than other children needs to be studied carefully. Although some stepmothers may have negative feelings toward their stepchildren, this rarely extends to physical abuse.³² Current evidence on maltreatment of stepchildren by stepfathers is controversial.^{33,34} More research is needed on the distribution of child abuse in different types of families.

It is important to remember that there is a great deal of variation in stepchildren's family experiences. Relationships between step-parents and stepchildren and the effects of step-family life on stepchild development appear to be influenced by a variety of factors. For example, step-parenting seems to be highly stressful, especially for stepmothers, when the stepchildren are not ordinarily resident in the household. Visiting stepchildren can be experienced as especially disruptive.¹⁷

In addition to the sex of the parent and the child, factors reported to influence the quality of step-parent-stepchild relationships include: the age of the child; the economic status of the step-family; and the frequency of contact between a child of divorce and the non-resident parent. Under favourable conditions, stepchildren may feel no more dissatisfaction than children in intact families. One of the goals of future social research should be to show what the positive conditions for child development in step-families may be.

Longitudinal data collected by the NLSCY will make it possible to study the development of stepchildren over time and to compare the progress of children who have different experiences of

childhood. Valuable information on family processes that affect children, such as age of the child at the time of the parents' separation and family reconstitution, will become available. In future, we will have a more dynamic picture of how families change and how children change with them.

References

1. Barr, L. 1993. *Basic Facts on Families in Canada, Past and Present*. Statistics Canada Catalogue no. 89-516. Ottawa: Minister of Industry.
2. Vanier Institute of the Family. 1991. *Canadian Families*. Ottawa: Vanier Institute of the Family.
3. Statistics Canada. 1995. *Marriages 1992*. Statistics Canada Catalogue no. 84-212. Ottawa: Minister of Industry.
4. Vanier Institute of the Family. 1994. *Profiling Canada's Families*. Ottawa: Vanier Institute of the Family.
5. Marcil-Gratton, N. 1993. "Growing up with a single parent: a transitional experience? Some demographic measurements." In *Single Parent Families*. Edited by J. Hudson and B. Galaway. Toronto: Thompson Educational Publishing.
6. Schlesinger, B., and E. Stasiuk. 1972. "Children of divorced parents in second marriages." In *Children of Separation and Divorce*. Edited by I. Stuart and L. Abt. New York: Grossman.
7. Wald, E. 1981. *The Remarried Family*. New York: Family Service Association of America.
8. Tatar, M. 1987. *The Hard Facts of the Grimms' Fairy Tales*. Princeton, NJ: Princeton University Press.
9. Dundes, A. (editor). 1982. *Cinderella: A Folklore Casebook*. New York: Garland.
10. Sierra, J. (editor). 1992. *Cinderella*. Phoenix: Oryx Press.
11. Yolen, J. 1982. "America's Cinderella." In *Cinderella: A Folklore Casebook*. Edited by A. Dundes. New York: Garland.

12. Stone, K. 1980. "Fairy tales for adults: Walt Disney's Americanization of the *märchen*." In *Folklore on Two Continents*. Edited by N. Burlakoff and C. Lindahl. Bloomington (IN): Trickster Press.

13. Daly, M., and M. Wilson. 1981. "Child maltreatment from a sociobiological perspective." *New Directions for Child Development* 11: 93–112.

14. Daly, M., and M. Wilson. 1985. "Child abuse and other risks of not living with both parents." *Ethology and Sociobiology* 6: 197–210.

15. Daly, M., and M. Wilson. 1987. "Children as homicide victims." In *Child Abuse and Neglect*. Edited by R. Gelles and J. Lancaster. New York: Aldine de Gruyter.

16. Wilson, M., and M. Daly. 1987. "Risk of maltreatment of children living with stepparents." In *Child Abuse and Neglect*. Edited by R. Gelles and J. Lancaster. New York: Aldine de Gruyter.

17. Amvert, A.-M. 1989. *Ex-Spouses and New Spouses*. Greenwich (CT): JAI Press.

18. Hobart, C. 1988. "The family system in remarriage." *Journal of Marriage and the Family* 50: 649–661.

19. Hobart, C. 1987. "Parent-child relations in remarried families." *Journal of Family Issues* 8: 259–277.

20. Granger, M., L. Desrochers-Boudreau, R. Laroche and R. Cloutier. 1990. "La qualité relationnelle dans la famille recomposée." *Service social* 39: 50–63.

21. Ihinger-Tallman, M. 1988. "Research on stepfamilies." In *Annual Review of Sociology*. Vol. 14. Edited by W.R. Scott. Palo Alto (CA): Annual Reviews Inc.

22. Cherlin, A., and F. Furstenberg. 1994. "Stepfamilies in the United States." In *Annual Review of Sociology*. Vol. 20. Edited by J. Hagan and K. Cook. Palo Alto (CA): Annual Reviews Inc.

23. Pasley, K., M. Ihinger-Tallman and A. Lofquist. 1994. "Remarriage and step-families." In *Step-parenting*. Edited by K. Pasley and M. Ihinger-Tallman. Westport (CT): Greenwood Press.

24. Ihinger-Tallman, M., and K. Pasley. 1987. *Remarriage*. Newbury Park (CA): Sage.

25. Ganong, L., and M. Coleman. 1994. *Remarried Family Relationships*. Thousand Oaks (CA): Sage.

26. Furstenberg, F., and A. Cherlin. 1991. *Divided Families*. Cambridge (MA): Harvard University Press.

27. La Novara, P. 1993. *A Portrait of Families in Canada*. Statistics Canada Catalogue no. 89-523E. Ottawa: Minister of Industry.

28. Smith, D. 1990. *Stepmothering*. New York: St. Martin's Press.

29. Morrison, K., and A. Thompson-Guppy. 1985. "Cinderella's stepmother syndrome." *Canadian Journal of Psychiatry* 30: 521–529.

30. Visher, E., and J. Visher. 1988. *Old Loyalties, New Ties*. New York: Brunner/Mazel.

31. Dainton, M. 1993. "The myths and misconceptions of the stepmother identity." *Family Relations* 42: 93–98.

32. Giles-Sims, J., and D. Finkelhor. 1984. "Child abuse in step-families." *Family Relations* 33: 407–413.

33. Gelles, R., and J. Harrop. 1991. "The risk of abusive violence among children with nongenetic caretakers." *Family Relations* 40: 78–83.

34. Trocme, N., Kwok Kwan Tam and D. McPhee. 1995. "Correlates of substantiation of maltreatment in child welfare investigations." In *Child Welfare in Canada*. Edited by J. Hudson and B. Galaway. Toronto: Thompson Educational Publishing.

Yes, Parenting Does Make a Difference to the Development of Children in Canada

Sarah Landy and Kwok Kwan Tam

The purpose of this research paper is to examine the well-being and competence of children in Canada, and to explore various parenting practices — both positive and negative — and particularly how they impact on the developmental outcomes of children at various ages. The outcomes considered include positive factors, such as children's motor and social development, helping behaviour, language development, satisfaction with their primary relationships and how they get along with other children. These aspects of a child's development are expected to increase satisfaction in family life and improve later adjustment and success in school and at work.¹⁻⁵

A number of children in Canada live in situations traditionally considered to place their development at risk. These include growing up in a single-parent household, with a teenage mother, in a dysfunctional family, in a family without support (see Appendix 1), in a low-income family,* or as a recent immigrant.[†] In this paper, parent and child variables which may affect physical and mental health will be examined for their impact on the development of children in Canada.^{6,7}

A final objective is to consider the effect of parenting practices on the development of children who live in adverse situations and to consider whether positive parenting practices can reduce the effects of these potentially negative factors and, consequently, improve child outcomes. From a theoretical point of view, this information can

enhance our understanding of the relationships among a variety of factors and how they contribute to normal development. Moreover, they can suggest strategies to avoid developmental difficulties and improve developmental outcomes for children. The findings will be discussed in light of their significance to the provision of services for parents and children and on the extent and type of guidance about parenting that can be offered to families.

Parenting Practice and Child Development

Child development outcomes have been the focus of a number of longitudinal studies and epidemiological surveys of children in Canada and other parts of the world; these outcomes have included such variables as cognitive development, language capacity and social competence.⁷⁻¹¹ These studies have also examined variables that contribute to outcomes, including characteristics of the child (such as temperament), parental factors, variables relating to parenting and interactions between parents and children, and sociodemographic factors. Researchers have generally concluded that the number and severity of risk factors have a major influence on the way children develop.⁷ Rather than being simply additive, factors in fact have a multiplying effect. Children exposed to four or more risk factors demonstrate dramatic reductions in their abilities and their competence level over time, and they often have a diminished IQ and increased social problems.¹²

More recently, researchers have been exploring the factors that seem to protect children who live in negative circumstances, producing in them an

* Defined according to Statistics Canada's "low income cut-offs." See "Income Ratio" in the Glossary of the Technical Appendix.

† A recent immigrant was defined as one who had been in Canada for less than five years.

apparent "invulnerability" or resilience and positive outcomes.¹³ In addition to child and environmental characteristics, parental variables and the relationships available to the child have been examined.¹⁴ Research has shown that positive outcomes occur when children have the opportunity to have warm, enhancing relationships with adults.^{15,16} These adults have included relatives, teachers, ministers and recreation workers. Moreover, parental factors and the quality of interaction between parents and children have been found to contribute significantly to both positive and negative outcomes for children.^{9-11,17,18} In other words, the positive things parents do with their children have a major influence on their development.

On the other hand, parenting problems have long been recognized as critical to the development of childhood disorders, especially conduct disorders. Much of the research has focused on discipline style as a crucial contributing factor.^{19,20} Other researchers have considered such variables as insensitivity²¹; lack of parent-child reciprocity²²; failure to monitor the child²⁰; and the lack of emotional availability and warmth and hostility in the caregiver's interactions.^{2,23-26} These studies have consistently found relationships between these parenting variables and the child's behaviour and development. Researchers have used these findings to develop prevention programs which focus on teaching parents how to interact with their children in optimal ways.²⁷⁻²⁹

Method

Data used in this research paper are from the first collection of data (Cycle 1) in the National Longitudinal Survey of Children and Youth (NLSCY) in 1994-1995. The data collection process is described in the Technical Appendix at the end of this publication.

The variables used in this paper can be grouped as "child outcomes," "parenting practices" and "risk factors." The child outcome variables are reports by the person most knowledgeable about the child (PMK; the mother in most cases) of children's relationships with others (for 4- to 11-year-olds); motor and social development (for newborns to 3-year-olds); helping behaviour (for 2- to 3-year-olds and for 4- to 11-year-olds, respectively); and receptive

vocabulary or words the child understands (for 4- to 5-year-olds). The parenting practice variables include four factors: positive parenting; hostile/ineffective parenting; consistent parenting; and aversive parenting. We also assessed the risk factors the child faces as a result of such family circumstances as single parenthood; teenage parenthood; low income; lack of social support for the parent; parental depression; family dysfunction; being recent immigrants; having four or more children; difficult temperament of the child; and prenatal problems. Detailed information concerning these measures is provided in Appendix 1.

Results

Since data on different variables were available for children only at certain ages, this analysis divides the sample into three primary age groupings: birth to 23 months; 2 to 3 years; and 4 to 11 years. The mean and standard deviations or percentages for each variable mentioned above are listed in Appendix 2. The data were weighted to better reflect the population of children in the ten provinces of Canada.

The Development of Children in Canada*

Social Relationships

Overall, the great majority of children aged 4 to 11 years were reported by PMKs to have few problems in their relations and to get on very well or quite well with others. However, when scores are broken down by relationships with parents, teachers, other children and siblings, children reported that they did less well in their relationships with siblings and slightly better with teachers. Relationships with parents were rated between those two (see Appendix 3).

Helping Behaviour

Most children in Canada aged 4 to 11 years were said by the PMKs to engage in helping behaviour "sometimes" to "often," receiving on average a score of 12 out of a possible 20. PMKs of 2- to 3-year-olds gave those children an average score of 5 out of a possible 10 (see Appendix 4).

* Since scores on the motor and social development (MSD) scale for children aged 0 to 3 years and the scores on receptive vocabulary (PPVT/EVIP) for children aged 4 to 5 years were standardized against the present sample, they both yield a mean of 100 and a standard deviation of 15.

Getting Along with Others and Peer Relationships

In response to questions concerning how they got along with others and peers, children aged 10 to 11 years reported, on average, that they got along well with others and had good peer relationships (see Appendix 5).

Differentiating the Development of Children Across a Number of Factors

To consider variations in the development of children in Canada, differences were examined by province, gender, urban/rural residence and age of the child. No significant differences were found among children in urban and rural residences. Any provincial differences in developmental factors varied according to the aspect of development under consideration. In other words, no predictable pattern was found which indicated that children who were doing well or poorly lived in particular provinces.

Significant differences in children were found only for gender and age. On all measures — whether motor and social development of 2- to 3-year-olds, receptive vocabulary of 4-year-olds or other social measures — boys were reported by PMKs to be doing slightly less well than girls (see Appendix 6). Interestingly, the trends in differences by age varied. While older children seemed to do slightly less well in social relationships, they were reported to engage in helping behaviour more often (see Appendix 7).

Relationship Between Parenting Practices and the Development of Children

Four aspects of interactive parenting practice were assessed: positive interaction; hostile/ineffective parenting; consistent parenting; and aversive parenting. Distribution of all these parenting practices was skewed toward the positive side; in other words, most parents practised more positive parenting than negative parenting (see Figure 1). Particularly for children under age 2, parents generally reported high positive interaction and low hostile/ineffective parenting.

Parenting practices were significantly related to most of the developmental outcomes considered in this paper. However, correlations between parenting variables and child outcomes were found to be small, implying that such variables represent

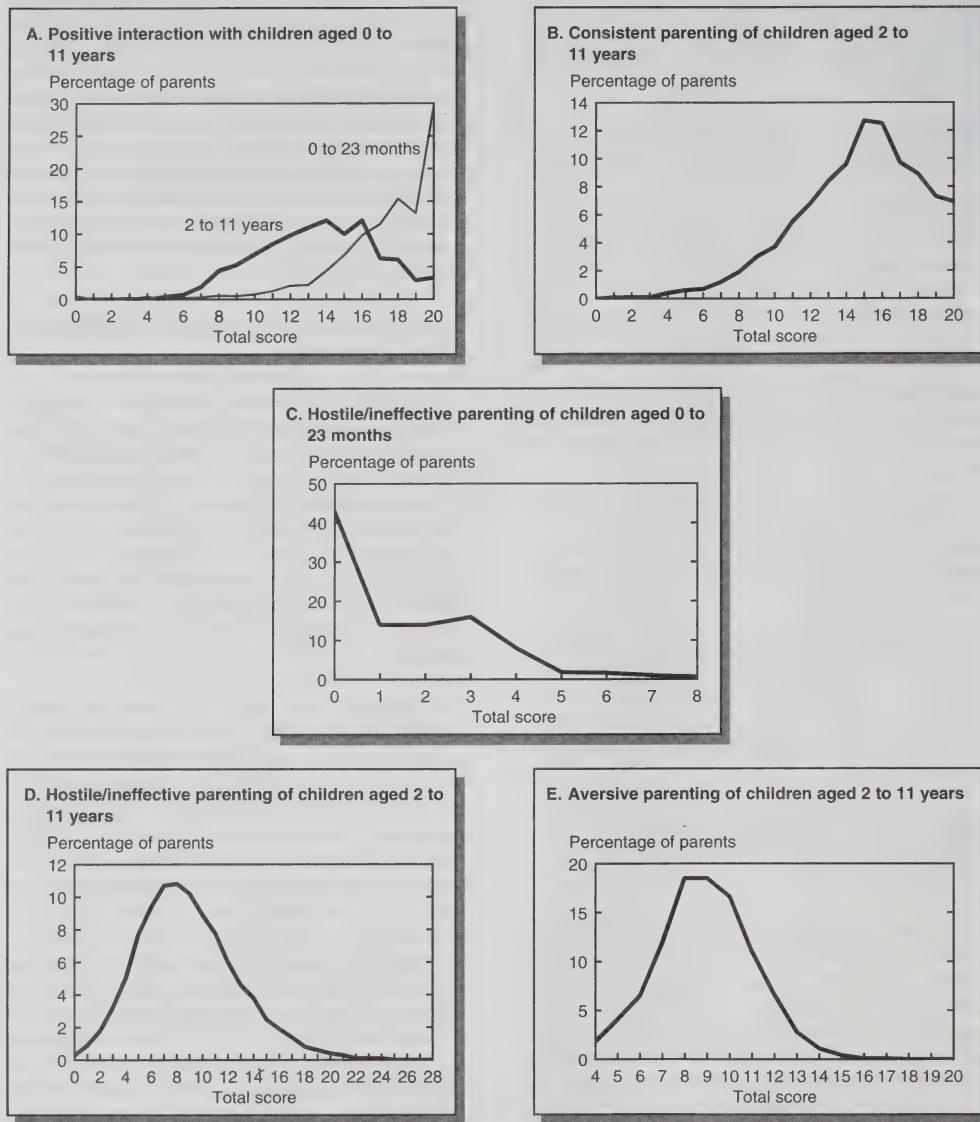
just one of a number of factors affecting children's development. The outcomes with the strongest association with the parenting practices examined in this paper were the child's overall social relationships and helping behaviour, while the outcomes with the weakest association were receptive vocabulary and motor and social development. Positive interaction showed the strongest relationship with overall social relationships, helping behaviour, and motor and social development of young children (see Appendix 8). On the other hand, hostility and aversive parenting indicated the strongest negative relationship with the child's social relationships and helping behaviour.

Relationship Between Risk Factors and Child Outcomes

This analysis considered a number of variables known to place children's development at risk (see Appendix 2 for a full list of these factors and the percentage of children who experienced them). On the basis of the NLSCY sample, it is estimated that 3.9% of Canada's children (approximately 180,000) are exposed to four or more risk factors (see Appendix 2); previous research has shown that the presence of four or more of these factors place children's development at risk in a number of areas of functioning.⁷

A number of risk factors related to the person most knowledgeable about the child (PMK) had a negative effect on certain child outcomes. These risk factors included single parenthood, ever having been a teenage parent, having a low income, feeling depressed, low social support, having four or more children in the family, difficult temperament of the child, low educational level and family dysfunction. Low social support, family dysfunction and depression in the PMK had an adverse effect on the most child outcome variables. However, most of these effects were small, even though they were statistically significant in many cases. The effects of these risk factors on the child's outcome became more obvious when we compared the outcomes of children who were exposed to four or more risk factors to those who were not. Children exposed to four or more risk factors showed significantly lower scores in overall social relationships (and also in getting along with others and peer relationships for children aged 10 to 11), helping behaviour for those aged 4 to 11, and receptive vocabulary. This indicates the importance of the cumulative effect of multiple risk factors.^{7,30}

Figure 1
Parenting practices



Source: NLSCY

On the other hand, findings linking individual risk factors to child outcomes are also worth mentioning. Recent immigrants' children aged 10 and 11 were doing better than children who had lived in Canada longer than five years. Children of

teenage parents, although their receptive vocabulary scores were lower than those of children of older parents, showed more helping behaviour. Also, although children of single parents did less well in some areas than children of two-parent

families, they had significantly higher scores on helping behaviour (children aged 2 to 3 years). Even among the risk factors noted above, the degree of the effect varied. Risk factors appeared to have their greatest impact on children's receptive vocabulary scores and their overall social relationships (see Appendix 9).

Significance of Parenting Practices for the Development of Children in At-risk Situations

To determine the effect of parenting on the development of children living in at-risk situations, two types of analysis were carried out. In one, risk factors and parenting factors were entered into a two-step regression analysis to determine their relative contribution to each child's outcome. Since girls consistently showed better results than their male counterparts, gender of the child was included in the regression analysis as a control. These results are presented in Appendix 10:

The results of the first step of each regression showed that risk factors contributed a small amount of the variance in each of the child outcomes. When parenting factors were entered into the second step of each regression, most of them added a significant, explained variance to each child outcome. For example, when the effects of various contributing variables were considered in children's overall social relationships, it was found that risk factors accounted for only 5% of the variance in the child's overall social relationships while parenting practices contributed 22% (see Appendix 10). However, except for the child's overall social relationships, most coefficients were small. This indicates that factors other than just the above-mentioned risk factors and parenting practices also affected the child's outcome.

To highlight the protective effect of parenting for children in at-risk environments, the outcome scores for children with four or more risk factors (at-risk) and those with fewer risk factors (non-risk) were considered, controlling for parenting practices. The parenting practices were constructed as dichotomous variables by taking the mid-point of each scale as the cutting score. All parenting practices — positive interaction, hostile/ineffective parenting, consistent parenting and aversive parenting — showed significant effects on the child's outcome for both non-risk and at-risk families. Except for consistent parenting, the scores

of the children who were in at-risk families but enjoyed positive parenting were similar to or above those in non-risk situations without positive parenting. Figure 2 illustrates this trend with respect to the child's social relationships and various parenting practices. Except for receptive vocabulary, all child outcomes in this paper showed similar trends: overall, children in at-risk situations had lower scores than children who were not at risk, but those who experienced positive parenting practices had outcome scores equivalent to or above those of children in more favourable situations who were exposed to negative parenting practices. Due to space limitations, the effect of parenting on other child outcomes is not presented in detail here.

Further analyses of the results for child social relationships and consistent parenting showed an interactional effect. In other words, consistent parenting practices affected the social relationships of children in both at-risk and non-risk families; however, consistent parenting showed more impact in a positive direction for children in at-risk families compared with those in non-risk families (see Figure 2).

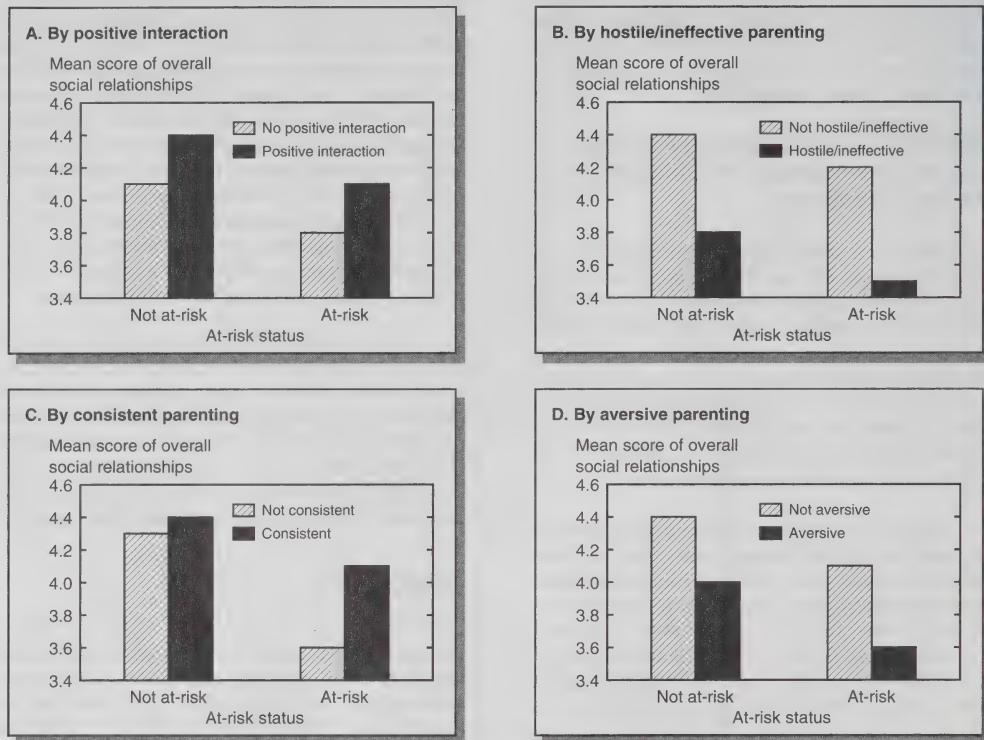
Discussion

For the most part, Canadian children met expected norms in developmental areas when using such standardized scores as the Motor and Social Development Scale (see Appendix 1) and the receptive vocabulary test (the Peabody Picture Vocabulary Test - Revised, or the *Échelle de vocabulaire en images Peabody*; see Appendix 1 to this paper and the Technical Appendix at the end of this publication for details).

Children generally appeared to get along well with others, and they reported positive relationships with peers, teachers and friends. However, despite these generally positive reports of relationships with others, more conflictual relationships were reported between siblings. Children consistently reported that they got on better with peers than with siblings or parents. This finding reflects the experience of many parents that sibling rivalry causes difficulties in families, a finding that is documented by researchers.³¹ PMKs responding about the children's helping-behaviour development indicated generally that the children "sometimes" to "often" showed supporting or helping behaviour toward others.

Figure 2

Overall social relationships by at-risk status and type of parenting



Source: NLSCY

Some of the findings about the lack of differences in Canada's children by province or by urban versus rural residence are important because they dispel a number of myths (for instance, that living in a rural area or in certain parts of Canada adversely affects the development of children). These variables did not appear to influence child development to the extent anticipated.

The significance of the effect of age on some outcomes, as well as the deterioration with age of a number of measures, can perhaps be explained by the increasing complexity of the child's world with age and with the approach of adolescence and the physical changes associated with it. Although boys have traditionally been shown to have somewhat slower language development in the preschool years, the lower scores in social relationships were not anticipated and are worthy of further exploration. It may be that the tendency

for boys to be somewhat more aggressive than girls contributed to these findings.

As had been anticipated, a number of risk variables adversely affected the development of children in Canada. These included family dysfunction, low social support and low income. Interestingly, in terms of overall social relationships and getting along with others, children aged 10 to 11 who had immigrated recently seemed to be doing better than children who had been in Canada longer. As well, children of single parents and teenage parents also did better on some variables. These findings suggest that although these children may need help in certain areas, they need not be considered at risk in many others. It should be noted that family dysfunction and low social support were the risk factors that contributed most to lower scores on the outcome measures. Strategies to alleviate these difficulties should be included in intervention

strategies in social programs. However, the fact that the effects were small in most cases and that they contributed little to overall outcomes indicates the importance of considering the cumulative effects of multiple risk factors in designing any intervention. As has been found in a number of studies in other parts of the world, children exposed to four or more risk factors did less well than children in more protective environments. There is a cumulative effect whereby one or two risk factors can be overcome, but the presence of any additional risk factors dramatically increases children's vulnerability and reduces the likelihood of positive outcomes.

In this study it was found that parenting practices significantly contributed to child outcomes and acted as a protective factor for children in at-risk environments. Children in at-risk situations who enjoyed positive parenting practices achieved scores within the average range for children in Canada. Sometimes their outcomes even surpassed those of children who were living in more favourable sociodemographic conditions but who were exposed to less positive parenting practices or to more hostile/ineffective parenting. These results and the contribution made by the parenting variables indicate that parenting practices are important contributors to child outcomes.

Certain characteristics of the data limit to some degree the applicability of the results of the study and its implications:

- Since most of the questionnaires required the PMK to provide the data, they made it possible for the PMK to provide what she or he thought were socially desirable responses.
- Complete standardized measures were not used for many of the developmental and parenting factors under consideration in order to reduce the number of questions being asked. Consequently, comparison with other studies is difficult.
- The cross-sectional nature of the first cycle of data does not allow analysis of the ongoing development of children over time in these results.
- The small, though significant, correlations obtained in this analysis limit the strength of the findings.

Some of these limitations will be overcome as further data is collected longitudinally.

Conclusions and Policy Recommendations

On average, children in Canada were functioning within expected standards in 1994–1995. However, a number of children were living in at-risk situations: 3.9% were facing the effects of having four or more risk factors, a situation known to jeopardize their development. The factors causing the greatest adverse effects were family dysfunction and low social support. However, the data show that positive parenting practices had a significant impact on children living in these at-risk situations.

The findings in this paper have significant implications for parents and families, as well as for intervention services. It is critical that parents — particularly single parents, teenage parents and those in low-income families — be informed about the importance of their parenting practices. This should include information about the importance of positive parenting for their children's development and the adverse effects of hostile and aversive parenting styles. We need to send the message that parents who seek information about parenting are responsible and caring. Parents will be encouraged by the knowledge that positive parenting can help their children overcome the difficulties they may face; parents will also be less prone to fatalistic beliefs about their capacity to make a difference in their children's lives because of their circumstances. Such encouragement could be provided to everyone in Canada using radio, television and widely available print materials. Moreover, professionals must be taught about the need to provide parenting support and must be given information on how to do this.

Intervention services for children need to emphasize:

- building strong communities that can form a basis of social support for families without other support systems;
- working with families — particularly those identified as being at-risk — to improve family functioning;
- providing intensive services for children exposed to multiple risk factors. These services should focus on enhancing parenting practices as well as providing support;

- providing training to parents to encourage positive parenting practices and techniques and also to inform them of the serious effects of hostile/ineffective parenting styles;
- providing community parent-support programs such as accessible, welcoming toy-lending libraries, drop-in centres and parent resource centres.

References

1. Berrueta-Clement, J., L. Schweinhart, W. S. Barnett, A. Epstein and D. Weikart. 1984. *Changed Lives: The Effects of the Perry Preschool Program on Youth Through Age 19*. Ypsilanti: High Scope Press.
2. Haveman, R., and B. Wolfe. 1995. "The determinants of children's attainments: a review of methods and findings." *Journal of Economic Literature*, XXXIII: 1829–1878.
3. Jencks, C., and S. Mayer. 1990. "The social consequences of growing up in a poor neighbourhood." In *Inner City Poverty in the United States*. Edited by L. Lynn and M. McGreary. Washington: National Academy Press.
4. Rutter, M. 1985. "Family and school influences on behavioural development." *Journal of Child Psychology and Psychiatry*, 26: 349–368.
5. Strayhorn, J. M. 1988. *The Competent Child*. New York: The Guilford Press.
6. Offord, D., R. Alder and M. Boyle. 1986. "Prevalence and sociodemographic correlates of conduct disorder." *American Journal of Social Psychiatry*, 6: 272–278.
7. Sameroff, A. J., R. Seifer, R. Barocas, M. Zax and S. Greenspan. 1987. "Intelligence quotient scores of 4-year-old children: social-environmental risks." *Pediatrics*, 79: 343–349.
8. Cohen, S. E., A. H. Parmalee and L. Beckwith. 1986. "Cognitive development in pre-term infants. Birth to 8 years." *Journal of Developmental Behavioural Pediatrics*, 7: 102–110.
9. Landy, S., R. De V. Peters, A. B. Allen and F. Brooks. 1992. *'Staying on Track' An Early Identification, Tracking and Referral System: Final Report to the Premier's Council on Health Strategy*. Toronto: Premier's Council on Health Strategy.
10. Marcovitz, S., S. Goldberg and D. McGregor. 1992. *Risk Factors in the Functioning of School Aged Developmentally Handicapped Children and Their Families. Final Report to the Ministry of Community and Social Services*. Toronto: Ministry of Community and Social Services.
11. Werner, E. E., and R. S. Smith. 1992. *Overcoming the Odds: High Risk Children from Birth to Adulthood*. New York: Cornell University Press.
12. Sannon, A., F. Oberklaid, R. Pedlow and M. Prior. 1991. "Risk indicators: assessment of infancy predictors of preschool behavioural maladjustment." *Journal of Child Psychology and Psychiatry*, 32: 609–626.
13. Radke-Yarrow, M., and T. Sherman. 1984. "Hard growing: children who survive." In *Risk and Protective Factors in the Development of Psychopathology*. Edited by J. Rolf, A. Master, D. Cicchetti et al. Cambridge: Cambridge University Press.
14. Rolf, J., A. Master, D. Cicchetti, K. H. Nuechterlein and S. Weintraub (editors). 1990. *Risk and Protective Factors in the Development of Psychopathology*. Cambridge: Cambridge University Press.
15. Rutter, M. 1990. "Psychosocial resilience and protective mechanisms." In *Risk and Protective Factors in the Development of Psychopathology*. Edited by J. Rolf, A. Master, D. Cicchetti. Cambridge: Cambridge University Press.
16. Sameroff, A. J., and R. Seifer. 1990. "Early contributors to developmental risk." In *Risk and Protective Factors in the Development of Psychopathology*. Edited by J. Rolf, A. Master, D. Cicchetti et al. Cambridge: Cambridge University Press.

17. Belsky, J. 1984. "The determinants of parenting: a process model." *Child Development*, 55: 83–96.
18. Gribble, P. A., E. L. Gwen, P. A. Wyman, W. C. Work, M. Wannan and A. Raoof. 1993. "Parent and child views of parent-child relationship qualities and resilient outcomes among urban children." *Journal of Child Psychology and Psychiatry*, 34: 507–579.
19. Dumas, J. E., and R. G. Wahler. 1985. "Indiscriminant mothering as a contextual factor in aggressive-oppositional child behaviour: 'Damned if you do and damned if you don't.'" *Journal of Abnormal Psychology*, 13: 1–17.
20. Patterson, G., B. D. DeBaryshe and E. Ramsey. 1989. "A developmental perspective on antisocial behaviour." *American Psychologist*, 44: 329–335.
21. Biringen, Z., J. L. Robinson and R. N. Emde. 1993. *Manual for Scoring the Emotional Availability Scales*. Denver: University of Colorado.
22. Rothbaum, F., and J. R. Weissz. 1994. "Parental caregiving and child externalizing behaviour in nonclinical samples: a meta-analysis." *Psychological Bulletin*, 116: 55–74.
23. Biringen, Z. 1990. "Direct observation of maternal sensitivity and dyadic interactions in the home: relations to maternal thinking." *Developmental Psychology*, 26: 278–284.
24. Campbell, S. 1990. *Behaviour Problems in Preschool Children: Clinical and Developmental Issues*. New York: The Guilford Press.
25. Campbell, S. 1995. "Behaviour problems in preschool children: a review of recent research." *Journal of Child Psychiatry*, 36: 113–149.
26. Walsh, A., and J. Beyer. 1987. "Violent crime, sociopathy and love deprivation among adolescent delinquents." *Adolescence*, 22: 705–717.
27. Cowen, E.L. 1984. "Research on primary prevention interventions: a sampler of action programs." In *Primary Prevention: An Idea Whose Time is Now*. Edited by S. E. Goldston and M. F. Shore. Washington: U.S. Government Printing Office.
28. Dinkmeyer, D., and G. D. McKay. 1982. *Systematic Training for Effective Parenting*. Circle Pines (MN): American Guidance Service.
29. Strayhorn, J. M., and C. S. Weidman. 1988. "A parent practices scale and its relation to parent and child mental health." *Journal of Academy of Child and Adolescent Psychiatry*, 27: 613–618.
30. Szatmari, P., H. S. Shannon and D. R. Offord. 1994. "Models of multiple risk: psychiatric disorder and poor school performance." *International Journal of Methods in Psychiatric Research*, 4: 231–240.
31. McDermott, J. 1980. *The Complete Book of Sibling Rivalry*. New York: Perigee Books.

Appendix 1. Measures used in this research paper

Child outcomes

1. **Relationships with others** (children aged 4 to 11 years): To obtain information about how the child got along with others, parents were asked questions about how the child got along with parents, teachers, other children and siblings. An overall social relationship score, ranging from 0 to 16, was computed by merging all four of the child's social relationship scores.
2. **Getting along with others and peer relationships** (children aged 10 to 11 years): Data on the children's relationships are important for identifying the extent and quality of children's social support networks. Data on how children aged 10 to 11 felt they got along with peers and their family were collected directly from these children who completed a questionnaire called "Friends and Family." The questionnaire, which asks for information about the presence of close friends and about how the child gets along with family members and friends, consists of 12 questions taken from the Marsh Self-Description Questionnaire and the Ontario Child Health Study. The areas of "peer relationships" and "getting along with others" are each a set of four questions.
3. **Motor and social development** (0 to 3 years old) was assessed using the Motor and Social Development (MSD) Scale developed by Dr. Gail Poe of the U.S. National Center for Health Statistics. The MSD Scale is a parent-report measure consisting of 15 questions to assess the dimensions of children's motor, social and cognitive development. The resulting standardized score has a mean of 100.
4. **Helping behaviour** (children aged 2 to 11 years) was measured by five questions adapted from the Ontario Child Health Study, five questions from the Montréal Longitudinal Study and four questions from a scale developed by Weir and Duveen. Two different sets of helping behaviour scores were computed for children aged 2 to 3 and 4 to 11, respectively.

5. **Receptive vocabulary** (for 4- and 5-year-olds only) was assessed using the Peabody Picture Vocabulary Test - Revised (PPVT-R) for English-speaking children and the very similar Échelle de vocabulaire en images Peabody for French-speaking children (see the Technical Appendix at the end of this publication for details). The tests assess the number of words the subject understands. The tests were standardized on a representative national sample of children and youth and a selected sample of adults, and the procedures meet the most rigorous expectations for test construction.

Parenting practices

Parenting practices were examined using an adaptation of the Parenting Practices Scale¹ and questions concerning aversive parenting from a questionnaire developed by Dr. M. Boyle. Four factors are obtained from the parenting assessment. The first three — positive interaction, hostile/ineffective parenting and consistent parenting — measure general parenting interaction. The questions concern how parents react to their children, such as "How often do you praise by saying something like, 'Good for you!' or 'What a nice thing you did!' or 'That's good going!'" or "How often do you get angry with your child when you punish?" The fourth factor — aversive parenting — describes how parents react when their child breaks the rules. Aversive parenting implies that the parent tells the child to stop, raises his/her voice and uses physical punishment, rather than calmly discussing the problem or describing alternative ways of behaving that are acceptable. For children aged 0 to 23 months, only positive interaction and hostile/ineffective parenting were assessed.

Risk factors

A variety of questions were used to collect sociodemographic information in the survey. Many questions were adapted from Statistics Canada's Labour Force Survey and 1991 Census questions. Other information was collected using the following measures:

1. **Centre for Epidemiological Studies-Depression Scale (CES-D Scale):** An abbreviated version of the CES-D Scale² was used to measure the frequency of depressive symptoms in the person most knowledgeable about the child (PMK). Scores from the scale indicate that a subject has no depression, mild depression, moderate depression or severe depression. A score of 13 or above from this abbreviated version of the CES-D Scale is adopted in this research paper, indicating that the subject was experiencing moderate to severe depression.
2. **Social support scale:** The level of social support of the PMK was assessed using a shortened version of the Social Provisions Scale.³ A score of 9 or below is used in this paper to indicate low social support.
3. **Family Assessment Device:** This 12-item questionnaire is derived from the McMaster Family Measure to measure dysfunction of the family. A score of 15 or above was used to indicate poor functioning within the family. A dysfunctional family was defined as one whose members showed difficulties resolving problems, communicating, controlling antisocial behaviour, and showing and receiving affection.
4. **Difficult temperament:** Difficult temperament was measured by a single-item question: "Please rate the overall degree of difficulty — would present for the average parent." It uses a 7-point scale ranging from 1 ("very easy") to 7 ("highly difficult to deal with"), with 4 as "ordinary, some problems." Children to whom the PMK had given a score of 5 to 7 were classified as having a difficult temperament.
5. **Prenatal problems:** Prenatal problems were assessed by asking the mother, "During your pregnancy with — did you suffer from any of the following: pregnancy diabetes, high blood pressure, and other physical problems?" Each prenatal problem was given a score of 1. A score of 3 indicates that the respondent had all three prenatal problems, while a score of 0 indicates that the respondent had none of the prenatal problems.

References

1. Strayhorn, J. M., and C. S. Weidman. 1988. "A parent practices scale and its relation to parent and child mental health." *Journal of Academy of Child and Adolescent Psychiatry*, 27: 613–618.
2. Radloff, L. S. 1977. "The CES-D scale: a self report depression scale for research in the general population." *Applied Psychological Measurement*, 1: 385–401.

3. Cutrona, C. E., and D. W. Russell. 1989. "The provision of social relationship and adaptation to stress." *Advances in Personal Relationship*, 1: 37–67.

Appendix 2. Means and standard deviations^a of factors considered in the research paper

	0 to 23 months (n = 3,677) ^b	2 to 3 years (n = 3,868) ^b	4 to 11 years (n = 15,286) ^b
Child outcomes			
Overall social relationships [1–5] ^c	n/a	n/a	4.4 (.6)
Relationship to other children [1–5]	n/a	n/a	4.5 (.7)
Relationship to teacher [1–5]	n/a	n/a	4.7 (.6)
Relationship to parent [1–5]	n/a	n/a	4.4 (.7)
Relationship to siblings [1–5]	n/a	n/a	3.8 (.9)
Friends and Family: getting along [0–16]	n/a	n/a	11.4 (2.9) ^c
Friends and Family: peers [0–16]	n/a	n/a	12.7 (2.9) ^c
Motor and social development	standardized in present study	standardized in present study	n/a
Helping behaviour [0–10]/[0–20] ^e	n/a	5.2 (2.8)	12.3 (3.9)
Receptive vocabulary (PPVT/EVIP)	n/a	n/a	standardized in present study ^f
Parenting variables			
Positive interaction ^g [0–20]	17.3 (3.1)	1.3 (2.6)	12.8 (3.1)
Hostility [0–8]/[0–28] ^h	1.5 (1.7)	9.1 (3.9)	9.1 (3.9)
Consistent parenting [0–20]	n/a	14.2 (3.5)	14.9 (3.4)
Aversive parenting [4–20]	n/a	9.2 (2.4)	8.8 (2.1)
Risk factors			
Single-parent family	12.3%	16.7%	16.3%
Teenage-parent family ⁱ	3.3%	3.8%	4.4%
Low-income family	27.3%	27.0%	23.4%
Low social support	3.6%	3.4%	3.4%
Low education of PMK ^j	7.0%	6.7%	7.8%
Depression of PMK	9.2%	10.1%	9.5%
Family dysfunction	8.3%	9.7%	8.2%
New immigrant ^k	5.1%	2.7%	2.7%
Four or more children at home	6.9%	8.1%	12.8%
Difficult temperament	4.4%	5.9%	n/a
Prenatal problem	29.0%	n/a	n/a
Percentage of at-risk status ^l (overall 3.9%)	5.5%	4.4%	3.4%

^a The standard deviations are in parentheses.

^b The n's are weighted with transformed weights from the sample of 22,831 from the NLSCY.

^c The range of the scales is in brackets [].

^d "Getting along" and "peers" are two dimensions of the self-reported measures "Friends and Family" for children aged 10 to 11 only, with a transformed weighted sample of n = 3,891.

^e "Helping behaviour" is assessed by two different scales for children aged 2 to 3 years and children aged 4 to 11 years, respectively.

^f PPVT is a standardized score assessed for children aged 4 and 5 only, with a transformed weighted sample of n = 3,452.

^g "Positive interaction" and "hostility" are assessed by two different scales for children aged 0 to 23 months and children aged 2 to 11 years, respectively.

^h "Teenage-parent family" is defined as a family in which the person most knowledgeable about the child (PMK) was 19 years old or younger when the child was born.

ⁱ "Low education of PMK" means that the person most knowledgeable about the child completed no more than nine years of education.

^j "New immigrants" refers to those who arrived in Canada less than five years ago.

^k Percentage of the weighted sample having four or more of the risk factors listed.

^l n/a Not applicable.

Source: NLSCY

Appendix 3. Social relationships of children aged 4 to 11 years (%)

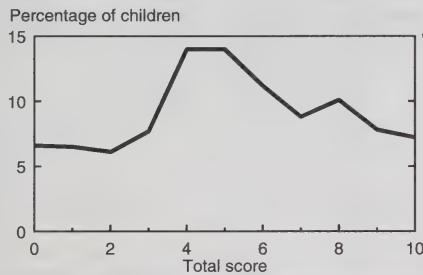
	Very well, no problem	Quite well, hardly any problems	Pretty well, occasional problems	Not too well, frequently problems	Not well at all, constant problems	Total
Other children (n = 14,986)	59.5	29.2	10.3	0.9	0.2 ^M	100.0
Teachers (n = 13,531)	77.5	15.9	5.4	1.1	0.1 ^M	100.0
Parents (n = 15,039)	58.0	29.8	11.3	0.8	0.1 ^M	100.0
Siblings (n = 13,216)	27.0	33.2	33.4	5.6	0.8	100.0

^M Estimate less reliable due to high sampling variability.

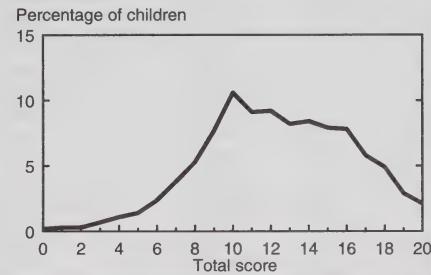
Source: NLSCY

Appendix 4. Children's helping behaviour

A. Children aged 2 to 3 years



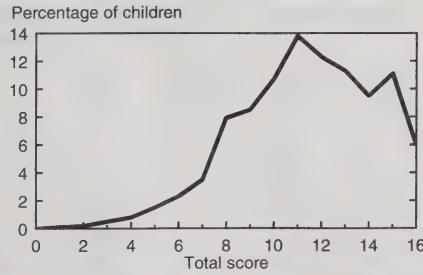
B. Children aged 4 to 11 years



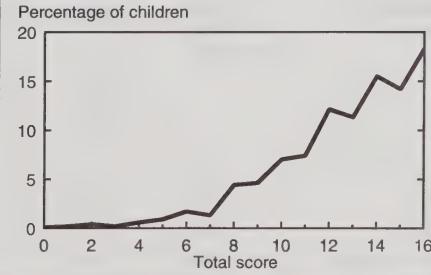
Source: NLSCY

Appendix 5. Getting along with others and peer relationships

A. Getting along with others: children aged 10 to 11 years



B. Peer relationships: children aged 10 to 11 years



Source: NLSCY

Appendix 6. Gender and child's outcome

Gender of the child	Overall social relationships	Friends and Family		Helping behaviour		Motor and social development	Receptive vocabulary
		Getting along with others	Peer relationships	2 to 3 years ^a	4 to 11 years ^a		
Male	4.3	11.4	12.4	4.7	11.6	97.7	98.9
Female	4.4	11.4	13.0	5.7	13.1	102.0	99.9

^a Comparisons with Oneway ANOVA are significant at $p \leq .05$

Source: NLSCY

Appendix 7. Age and child's outcome

Age of the child (years)	Overall social relationships	Friends and Family		Helping behaviour	
		Getting along with others	Peer relationships	2 to 3 years ^a	4 to 11 years ^a
2	n/a	n/a	n/a	4.6	
3	n/a	n/a	n/a	5.8	
4	4.5	n/a	n/a		10.8
5	4.4	n/a	n/a		11.8
6	4.4	n/a	n/a		12.2
7	4.4	n/a	n/a		12.7
8	4.3	n/a	n/a		12.6
9	4.3	n/a	n/a		12.7
10	4.3	11.3	12.6		13.1
11	4.3	11.4	12.8		13.1

Note: Motor and social development and receptive vocabulary are not compared by age because they are standardized by age in this survey.

^a Comparisons with Oneway ANOVA are significant at $p \leq .05$

n/a Not applicable.

Source: NLSCY

Appendix 8. Correlations between parenting practices and social relationships, motor and social development, helping behaviour, and receptive vocabulary

Parenting practice	Overall social relationships	Friends and Family		Helping behaviour		Motor and social development		Receptive vocabulary
		Getting along with others	Peer relationships	2 to 3 years	4 to 11 years	0 to 23 months	2 to 3 years	
Positive interaction	.240	.101	.074	.165	.179	.228	.175	.069
Hostility	-.487	-.223	-.155	-.021	-.235	.072	-.073	-.035
Consistency	.132	.052	.056	.114	.163		.096	.146
Aversive parenting	-.320	-.155	-.111	-.167	-.238		-.176	-.041

Note: All correlation coefficients are significant at $p \leq .05$

Source: NLSCY

Appendix 9. Comparison of means of child's outcome between a number of risk variables

Risk factors	Overall social relationships	Friends and Family		Helping behaviour		Motor and social development	Receptive vocabulary
		Getting along with others	Peer relationships	2 to 3 years	4 to 11 years		
	4 to 11 years	10 to 11 years	2 to 3 years	4 to 11 years	0 to 3 years	4 to 5 years	
	n = 11,953	n = 3,096	n = 3,393	n = 3,410	n = 14,605	n = 6,778	n = 3,422
Single parents	4.2 ^a	9.6 ^a	12.4 ^a	5.6 ^a	12.1 ^a	100.9	95.7 ^a
Not single parents	4.4	11.7	12.8	5.1	12.4	99.9	100.1
Teenage parents	4.3 ^a	11.3	12.4	5.7 ^a	12.7 ^a	101.4	93.9 ^a
Not teenage parents	4.4	11.4	12.7	5.2	12.3	100.0	99.7
Low income	4.3 ^a	10.9 ^a	12.4 ^a	5.4 ^a	12.2	99.5	94.5 ^a
Not low income	4.4	11.5	12.8	5.1	12.4	100.2	101.1
Low support	4.2 ^a	10.5 ^a	12.8	5.0	11.7 ^a	95.5 ^a	93.5 ^a
Not low support	4.4	11.4	12.7	5.2	12.4	100.1	99.7
Low education of PMK	4.4	11.8 ^a	12.9	5.2	11.6 ^a	98.4 ^a	89.5 ^a
Not low education of PMK	4.4	11.3	12.7	5.2	12.4	100.1	100.1
PMK depressed	4.1 ^a	9.9 ^a	12.1 ^a	5.7 ^a	12.2	98.0 ^a	93.4 ^a
PMK not depressed	4.4	11.5	12.8	5.2	12.4	100.2	100.0
Family dysfunction	4.1 ^a	10.4 ^a	11.6 ^a	5.0	11.3 ^a	98.0 ^a	92.8 ^a
No family dysfunction	4.4	11.5	12.8	5.2	12.4	100.2	100.1
Recent immigrants	4.6 ^a	12.7 ^b	12.5 ^a	5.0	12.4	98.7	93.4 ^a
Not recent immigrants	4.4	11.4	12.7	5.2	12.4	100.1	99.6
Four or more children	4.4 ^a	11.5	12.5	5.0	12.3	98.4 ^a	96.1 ^a
Three or fewer children	4.3	11.4	12.7	5.2	12.4	100.1	99.8
Difficult temperament	n/a	n/a	n/a	4.2 ^a	n/a	95.0 ^a	n/a
No difficult temperament	n/a	n/a	n/a	5.1	n/a	99.9	n/a
Prenatal problem	n/a	n/a	n/a	n/a	n/a	100.2	n/a
No prenatal problem	n/a	n/a	n/a	n/a	n/a	100.2	n/a
Four or more risk factors	4.0 ^a	10.0 ^a	12.0 ^a	5.4	11.5 ^a	97.9 ^a	85.9 ^a
Three or fewer risk factors	4.4	11.4	12.7	5.2	12.4	100.1	99.8

^a p ≤ .05 from ANOVA results

^b This comparison should be treated with caution as the coefficient of variation is 19.3% due to the small number of recent immigrants in the sample.

n/a Not applicable.

Source: NLSCY

Appendix 10. Regression analyses of the child's outcome with family risk factors and parenting variables

	Overall social relationships		Friends and Family (10 to 11 years)				Helping behaviour				Motor and social development		Receptive vocabulary	
			Getting along with others		Peer relationships		2 to 3 years		4 to 11 years					
	n = 11,502		n = 2,962		n = 3,246		n = 3,275		n = 14,100		n = 3,517		n = 3,354	
	beta	beta	beta	beta	beta	beta	beta	beta	beta	beta	beta	beta	beta	beta
Family risk factors														
Single-parent family	-.059	-.041	-.255	-.240	-.053	-.043	.041	.057	-.036	-.031	.056	.070	n.s.	n.s.
Teenage-parent family	n.s.	n.s.	n.s.	n.s.	n.s.	n.s.	n.s.	n.s.	.020	.023	n.s.	.040	n.s.	n.s.
Low-income family	n.s.	n.s.	n.s.	n.s.	n.s.	n.s.	n.s.	n.s.	.020	-.092	-.091	-.119	-.111	
Low social support	-.022	-.025	n.s.	n.s.	n.s.	n.s.	n.s.	n.s.	-.029	-.026	-.069	-.070	-.041	-.042
Low parental education	.040	.031	.092	.082	n.s.	.037	n.s.	n.s.	-.054	-.042	-.062	-.051	-.126	-.111
Depression in PMK	-.112	-.076	-.100	-.075	-.041	n.s.	.059	.062	.026	.062	n.s.	n.s.	-.056	-.048
Family dysfunction	-.058	n.s.	n.s.	n.s.	-.090	-.071	n.s.	n.s.	-.076	-.032	-.038	n.s.	-.080	-.069
Recent immigrants	.053	.033	.051	.052	n.s.	n.s.	n.s.	n.s.	n.s.	-.018	n.s.	n.s.	-.041	-.041
Four or more children	.026	.047	n.s.	n.s.	n.s.	n.s.	n.s.	n.s.	n.s.	n.s.	n.s.	n.s.	-.050	-.056
Difficult temperament	n/a	n/a	n/a	n/a	n/a	n/a	-.117	-.110	n/a	n/a	-.076	-.053	n/a	n/a
Prenatal problem	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
Control variables														
Male child	-.073	-.029	n.s.	n.s.	-.102	-.092	-.173	-.175	-.181	-.166	-.209	-.211	n.s.	n.s.
Parenting variables														
Positive interaction		.124		n.s.		n.s.		.135		.109		.128		.036
Hostility		-.409		-.143		-.100		.169		-.112		.090		n.s.
Consistency		-.031		-.045		n.s.		.124		.097		.064		.098
Aversive parenting		-.063		-.079		n.s.		-.170		-.125		-.151		n.s.
Adjusted R square	.047	.271	.095	.129	.026	.041	.051	.114	.043	.127	.072	.115	.070	.079
Change of R square		.224		.034		.015		.063		.084		.043		.009

Note: All coefficients presented are statistically significant at $p \leq .05$

n.s. Not statistically significant.

n/a Not applicable.

Source: NLSCY

Emotional and Behavioural Problems

David R. Offord and Ellen L. Lipman

Introduction

Emotional and behavioural problems in children impose a heavy burden of suffering.¹ The Ontario Child Health Study, a province-wide community survey of children and adolescents aged 4 to 16 conducted in 1983, found that the prevalence of one or more psychiatric disorders was 18.1%.² Not only do the children with these disorders have troublesome symptoms and behaviours, but the literature indicates that in many instances the onset of the disorders in childhood heralds a lifetime of serious psychosocial disturbances. For example, nearly half of those children with conduct disorder or antisocial behaviour have increased rates of problems such as criminality, psychopathy and substance abuse in adolescence and adulthood.^{3,4} Further, the distribution of children's emotional and behavioural problems varies by the income level of their family and other sociodemographic features.^{5,6} Lastly, child psychiatric disorders regularly occur along with other disorders,^{6,7} and they also commonly co-occur with other problems in childhood such as poor school performance and social impairment.^{6,8}

This research paper uses data from the National Longitudinal Survey of Children and Youth (NLSCY) to examine, by age and gender subgroups, the frequency of individual symptoms of emotional and behavioural disorders and the rates of these disorders and other problems (including repeating a grade and impairment in social relationships). It also presents the distribution of these problems by income level and indicates their patterns of common occurrence.

Methodology

The NLSCY is a longitudinal survey of a random sample of 22,831 children living in Canada. The major goals of the survey include both scientific and policy ones. In the scientific domain, it is hoped that the information will increase the understanding of the distribution of problems and positive or protective factors in different subgroups of children and youth. It should also shed light on the causal pathways leading to the onset, persistence, remission and reoccurrence of these problems and protective factors throughout the developmental years. In the policy domain, the data will address critical issues concerning the rationale for the distribution of increasingly scarce resources to different subgroups of children living in Canada in order to maximize their chances for healthy development. Data collection will occur every two years; the first round of data collection (Cycle 1), on which this research paper is based, was carried out in the winter of 1994–1995.

The methodological details of the NLSCY are outlined in the Technical Appendix at the end of this publication; only issues specific to this paper are discussed here.

Respondent

The only source of data used in this research paper was information from the household member most knowledgeable about the child (PMK), usually the mother.

Variables

Emotional and Behavioural Problems

Three disorders were included under this general heading.

Conduct disorder: characterized by aggression, either physical or indirect, or a violation of social norms.

Hyperactivity: characterized by inattention, impulsivity and motor activity.

Emotional disorder: characterized by feelings of anxiety or depression.

One or more disorders: one or more of conduct disorder, hyperactivity or emotional disorder.

The measurement of each of these disorders was guided by pre-existing scales.^{9,10} The items used to measure conduct disorder, hyperactivity and emotional disorder are listed in Tables 1, 2 and 3, respectively. Thresholds to distinguish the presence or absence of individual disorders were set by summing the responses to individual items (1 = "sometimes or somewhat true;" 2 = "often or very true") and setting a threshold at which 10% of the children scored above the threshold and were said to have the disorder. These arbitrary thresholds for disorders result in a prevalence rate of one or more disorders of 20.7%; this is within the range of the prevalence rates of one or more disorders in five community samples which varied between 17.6% and 22.0%.¹¹

The 10% threshold for individual disorders set for the whole sample permits an examination of the changes in rates of disorder by age and gender. However, it has major limitations. It does not, for example, take into account the different prevalence rates of individual disorders by age and gender.² A later paper on the NLSCY will examine the prevalence rates and patterns of distribution of individual disorders by age and gender using clinically derived thresholds to indicate the presence or absence of disorder.^{10,12}

Repeated a Grade

The child repeated at least one grade during his or her school career. This measure is available for 6- to 11-year-olds only.

Impairment in Social Relationships

The child had frequent or constant problems in getting along with others such as friends or classmates, teachers, or the family.

One or More Problems

The child had one or more of: one or more emotional or behavioural disorders, repeated a grade, or impairment in social relationships. This variable is available for 6- to 11-year-olds only.

Income Levels

The four categories of income levels* were based on the strategy used by Statistics Canada to arrive at the low income cut-off (LICO).¹³ This definition includes a correction for income level for both family size and place of residence. The definitions of the four categories are as follows:

Very poor: includes children living in families where the adjusted family income is below 75% of the LICO. The percentages of children aged 4 to 7 and 8 to 11 included in this category were 15.9% and 13.2%, respectively. In large urban areas with populations over 500,000 (e.g., Montreal, Toronto, Vancouver), the yearly income for a four-person household would be less than \$23,303.

Poor: includes children living in families where the adjusted family income is between 75% and 100% of the LICO. The percentages of children aged 4 to 7 and 8 to 11 included in this category were 9.3% and 8.1%, respectively. In large urban areas, the yearly income for a four-person household would range from \$23,303 to \$31,071.

Not poor: includes children living in families where the adjusted family income is up to 25% above the LICO. The percentages of children aged 4 to 7 and 8 to 11 included in this category were 10.4% and 10.1%, respectively. In large urban areas, the yearly income for a four-person household would range from \$31,072 to \$38,838.

Well-off: includes children living in families where the adjusted family income is more than 25% above the LICO. The percentages of children aged 4 to 7 and 8 to 11 included in this category were 64.3% and 68.7%, respectively. In large urban areas, the yearly income for a four-person household would be \$38,839 or more.

* See "Income Ratio" in the Glossary of the Technical Appendix for data quality information regarding income levels.

Statistical Analyses

Statistical significance for the data in Figure 1 was determined using the chi-square test and testing for linear trend. Statistical significance is not reported for differences in prevalence rates by age and gender for individual symptoms or for disorders. With the large sample size, the important concept is whether or not differences are clinically important or meaningful.

Results

Individual Symptoms

Tables 1 to 3 present data on the frequency of symptoms of conduct disorder, hyperactivity and emotional disorder by age and gender. In every instance, the frequencies reported are for response category 2 ("often or very true").

Table 1 shows that for symptoms of physical aggression, the frequencies for all subgroups were, with one exception, higher in boys than in girls. Only for "threatens people" in 8- to 11-year-olds was the rate higher in girls than boys (1.2% and 0.7%, respectively). Further, in all comparisons by age among boys, the symptom rates in 4- to 7-year-olds (younger age group) were higher than those in 8- to 11-year-olds (older age group). For girls, this pattern was not as marked: the rates were higher in the younger age group than in the older age group in only two of the six comparisons. The frequency of four symptoms — "gets in many fights", "physically attacks people", "threatens people" and "kicks, bites, hits other children" — tended to increase with age in girls.

With respect to indirect aggression, Table 1 shows that among the younger age group, the rates were higher in girls than in boys in four of five comparisons; in the older age group, the rates were higher in girls in all five comparisons. For example,

Table 1. Frequency of conduct symptoms by age and gender

	Age and gender groups			
	4-7 years old		8-11 years old	
	Boys %	Girls %	Boys %	Girls %
Physical aggression				
Gets into many fights	5.1	3.2	4.7	3.8
When another child accidentally hurts him/her (such as bumping into him/her), assumes the child meant to do it and then reacts with anger and fighting	7.2	5.5	6.9	4.4
Physically attacks people	1.9 ^M	0.5 ^U	1.7 ^M	0.7 ^M
Threatens people	1.1 ^M	0.8 ^M	0.7 ^M	1.2 ^M
Is cruel, bullies or is mean to others	1.1 ^M	0.5 ^U	0.6 ^M	0.4 ^U
Kicks, bites, hits other children	1.6 ^M	0.4 ^U	1.1 ^M	0.5 ^U
Indirect aggression				
When mad at someone, tries to get others to dislike that person	1.5 ^M	1.8 ^M	1.8 ^M	2.8
When mad at someone, becomes friends with another as revenge	1.3 ^M	1.9 ^M	0.8 ^M	2.4
When mad at someone, says bad things behind the other's back	1.6 ^M	1.6 ^M	2.2	2.3
When mad at someone, says to others: let's not be with him or her	1.5 ^M	2.3	1.5 ^M	2.8
When mad at someone, tells the other one's secrets to a third person	1.0 ^M	1.9 ^M	1.1 ^M	2.0 ^M
Property offences				
Steals at home	0.7 ^M	0.5 ^U	0.9 ^M	0.4 ^U
Vandalizes	0.3 ^U	0.1 ^U	0.4 ^U	0.2 ^U
Steals outside the home	0.1 ^U	0.3 ^U	0.1 ^U	0.1 ^U
Destroys his/her own things	3.8	1.6 ^M	2.6 ^M	1.2 ^M
Destroys things belonging to his/her family or to other children	1.4 ^M	0.4 ^U	0.7 ^M	0.3 ^U

^M Because of the low prevalence rates, the estimates are unstable and should be used with extreme caution.

^U Estimates do not meet Statistics Canada's quality standards. Conclusions based on these data will be unreliable and, most likely, invalid.

Source: NLSY

for the symptom "when mad at someone, becomes friends with another as revenge," the girl and boy frequencies were very close in the younger age group (1.9% and 1.3%, respectively); this symptom was three times more common in girls than in boys in the older age group (2.4% and 0.8%, respectively). With age, the frequencies of the symptoms increased for both genders but more so for girls. For the third group of symptoms — property offences — the symptom rates were low and the differences in gender and age were not marked. The exception was "destroys his/her own things," where again both the younger age group and the boys tended to have higher figures.

Lastly, it should be noted that the frequencies of conduct symptoms overall were low: three-quarters (75%) were less than 2%. In only four instances (8%) did the frequencies exceed 5%. Three of these were for the symptom "when another child accidentally hurts him/her, assumes the child meant to do it, and then reacts with anger and fighting," where the rates exceeded 5% for all but older girls. The fourth instance was for "gets into many fights," where the rate was 5.1% for the younger boys.

Table 2 presents the frequencies for hyperactivity symptoms. The rates were much higher than those for conduct disorder. For 24 of 32 (75%) cases (eight symptoms in each age and gender group), the frequencies exceeded 5%. In all comparisons, the frequencies were higher in boys than in girls. The most marked boy-girl difference was for the symptom "is distractible, has trouble sticking to any activity," where among the

younger age group the boy-girl ratio was 2.2:1 (11.1% and 5.1% for boys and girls, respectively). No clear pattern emerged for changes in frequency by age. For both boys and girls, the rates increased with age for four of the eight symptoms. In almost all instances, the changes in frequencies were not pronounced. The most marked change was in the symptom "has difficulty awaiting turn in games or groups," where the prevalence rate dropped from 15.6% in the younger boys to 9.8% in the older boys, a reduction of over one-third (37%).

Table 3 reveals the frequencies of emotional symptoms by age and gender. As with conduct disorder, the majority (82%) of symptom frequencies was below 5%. The most common symptoms were "is worried" in older girls (8.1%), and "cries a lot" in younger girls (7.4%). In six of eight instances in the younger age group, the rates were higher in boys than girls. The most marked boy-girl difference was for the symptom "is not as happy as other children," where the rate among boys was four times that among girls (2.1% and 0.5%, respectively). In the older age group, the frequencies were higher in girls than in boys in five of eight instances but the differences were not marked. The age comparisons reveal that the rates of the symptoms almost always increased with age. One of the only exceptions was for the symptom "cries a lot," where the rates decreased with age (from 5.3% to 4.2% for boys and from 7.4% to 5.7% for girls). The most marked increase by age was for the symptom "is worried," where the frequency in girls more than doubled with age (from 3.3% to 8.1%).

Table 2. Frequency of hyperactivity symptoms by age and gender

Symptom	Age and gender groups			
	4-7 years old		8-11 years old	
	Boys %	Girls %	Boys %	Girls %
Can't sit still, is restless or hyperactive	24.7	17.0	21.6	14.4
Fidgets	19.5	13.0	20.2	12.9
Is distractible, has trouble sticking to any activity	11.1	5.1	14.0	8.2
Can't concentrate, can't pay attention for long	7.9	3.7	10.5	4.9
Is impulsive, acts without thinking	10.6	5.2	11.3	7.6
Has difficulty awaiting turn in games or groups	15.6	10.5	9.8	6.0
Cannot settle to anything for more than a few moments	8.0	4.6	6.9	3.8
Is inattentive	3.8	2.0 ^M	5.4	2.8

^M Because of the low prevalence rates, the estimates are unstable and should be used with extreme caution.

Source: NLSCY

Table 3. Frequency of emotional symptoms by age and gender

Symptom	Age and gender groups			
	4-7 years old		8-11 years old	
	Boys %	Girls %	Boys %	Girls %
Seems to be unhappy, sad or depressed	0.9 ^M	0.8 ^M	1.7 ^M	1.2 ^M
Is not as happy as other children	2.1	0.5 ^U	2.5	2.6
Is too fearful or anxious	3.8	3.7	4.9	4.9
Is worried	3.3	3.3	6.4	8.1
Cries a lot	5.3	7.4	4.2	5.7
Is nervous, high-strung or tense	3.4	2.0 ^M	4.6	4.3
Has trouble enjoying him/herself	0.9 ^M	0.8 ^M	1.2 ^M	1.5 ^M
Appears miserable, unhappy, tearful or distressed	1.3	0.8 ^M	1.1 ^M	2.1

^M Because of the low prevalence rates, the estimates are unstable and should be used with extreme caution.^U Estimates do not meet Statistics Canada's quality standards. Conclusions based on these data will be unreliable and, most likely, invalid.

Source: NLSCY

Emotional and Behavioural Problems, Repeating a Grade and Impairment in Social Relationships

Table 4 presents the data on the frequency of emotional and behavioural problems by age and gender. As noted previously, the determination of the presence of the individual problems (conduct disorder, hyperactivity and emotional disorder) was arbitrarily made by identifying the top 10% of the children with the highest scale scores for that specific disorder. For emotional and behavioural problems, the highest rate was among boys aged 8 to 11 (26.0%) and the lowest was among girls

aged 4 to 7 (16.0%). Among boys of both age groups, hyperactivity was the most common disorder, followed by conduct disorder. Emotional disorder increased significantly from younger to older boys (from 6.1% to 11.8%). In girls, conduct disorder was more common than hyperactivity for both age groups, but the highest prevalence occurred for emotional disorder in 8- to 11-year-olds (11.3%). All prevalence rates of disorders were higher for boys than for girls. The most marked difference in hyperactivity was among the younger age group, where the rate in boys was over twice that in girls (14.0% compared with 6.1%).

Table 4. Frequency of problems by age and gender

	Emotional and behavioural problems						
	Conduct disorder	Hyperactivity	Emotional disorder	One or more disorders	Repeated a grade ^a	Impairment in social relationships	One or more problems ^a
Boys							
4-7	10.6	14.0	6.1	21.9	2.9	2.7	27.4
8-11	11.3	14.0	11.8	26.0	8.1	4.2	31.0
4-11	11.0	14.0	9.0	24.0	6.5	3.5	29.9
Girls							
4-7	8.3	6.1	5.8	16.0	2.1	1.5	19.1
8-11	8.2	6.7	11.3	18.8	5.8	2.9	24.0
4-11	8.3	6.4	8.6	17.4	4.6	2.3	22.4
Boys and Girls							
4-7	9.5	10.2	6.0	19.0	2.5	2.1	23.3
8-11	9.8	10.4	11.6	22.4	6.9	3.6	27.5
4-11	9.6	10.3	8.8	20.7	5.6	2.9	26.2

^a Data available for 6- to 11-year-olds only.

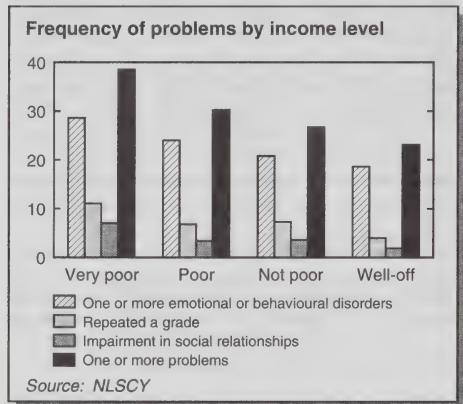
Source: NLSCY

Repeating a grade increased with age, as one would expect. The frequency in both age groups was higher in boys than in girls, reaching 8.1% in older boys. Impairment in social relationships was again more common in boys than in girls for both age groups. As with emotional and behavioural disorders, the rate of one or more problems was highest in boys aged 8 to 11 (31.0%) and lowest in girls aged 4 to 7 (19.1%).

Problems by Income Level

Figure 1 compares the frequencies of the selected problems by income level. In general, the problems decreased as the income level rose. The one exception was in "impairment in social relationships," where the rates in the poor and not-poor were 3.4% and 3.6%, respectively. However, even for this variable, the rate among the very poor was more than three times the rate among the well-off (7.0% compared with 1.9%). For all the other variables, the very poor were the most disadvantaged, followed by the poor, the not-poor and the well-off. For all variables, the pattern of differences across income levels was highly statistically significant.

Figure 1

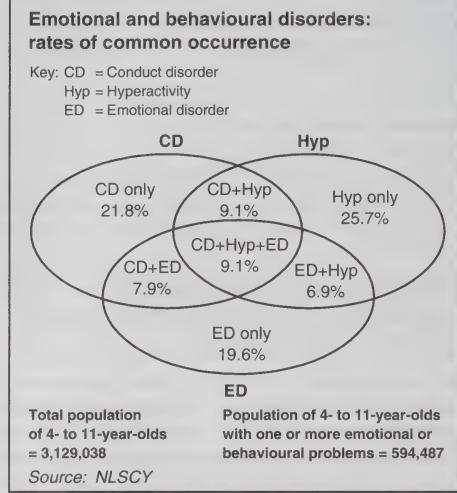


Overlap Among Behavioural and Emotional Disorders

Figure 2 illustrates the extent of overlap among the three behavioural and emotional disorders. The percentages shown add up to 100. Conduct disorder occurred in 47.9% of the children with emotional and behavioural problems ($21.8\% + 9.1\% + 7.9\% = 47.9\%$). Of children with conduct disorder, over half (54.5%) had at least one other disorder

($9.1\% + 9.1\% + 7.9\% / 47.9\%$). The percentages of hyperactive and emotionally disordered children with at least one other disorder were 49.4% and 54.9%, respectively. Further, of children with one disorder, 33.0% of them had a second or a third disorder and 9.1% had all three disorders.

Figure 2



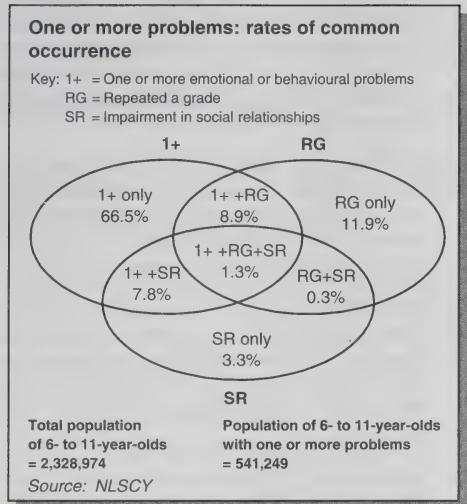
One or More Problems Occurring Together

Figure 3 focuses on the rates of occurrence of one or more problems. As in Figure 2, the percentages add up to 100. Of the children with one or more problems, 84.5% had one or more behavioural problems ($66.5\% + 8.9\% + 1.3\% + 7.8\% = 84.5\%$). Of the children with emotional and behavioural problems, one in five (21.3%) had repeated a grade or were experiencing impairment in social relationships or both ($8.9\% + 1.3\% + 7.8\% / 84.5\% = 21.3\%$). Of children who had repeated a grade, nearly half (45.5%) also had an emotional or behavioural problem. Lastly, of those with impairment in social relationships, three-quarters (74.0%) had emotional or behavioural problems or had repeated a grade or both.

Discussion

The variation in the symptom patterns by age and gender illustrates the changes that occur over the developmental years, as well as the importance of

Figure 3



always considering separately the developmental pathways of boys and girls. While the symptoms of physical aggression were more common in boys than girls in both age groups, the symptom frequencies for indirect aggression tended to be higher in girls than boys, especially in the older age group. The frequency of symptoms of indirect aggression and emotional disorder almost always increased over the childhood years. The frequency of symptoms also varied by disorder; rates were relatively low in conduct disorder and emotional disorder and relatively high in hyperactivity, where the prevalence rates exceeded 5% for three-quarters of the symptoms. The latter finding illustrates the point that the presence of an individual symptom cannot be taken as evidence of an emotional or behavioural disorder; this requires the presence of a group of symptoms.

The finding that the rates of all problems (conduct disorder, hyperactivity and emotional disorder) were higher in preadolescent boys than girls agrees with the literature.^{2,6,8} However, as with symptom patterns, changes will occur over the developmental years; for example, in 12- to 16-year-olds, the rate of emotional disorder can be expected to be noticeably higher in girls than boys.²

The findings on the decreasing frequencies of problems by income level illustrate not only the disadvantaged status of poor children compared with their wealthier peers but also show that there is a pattern of decreasing frequency of problems

with increasing income levels which occurs across all income levels. The reasons for this pattern are not completely understood but there is mounting evidence that it is a result of varying degrees of disabilities set early in life in the preschool and early school years.¹⁴ This suggests the possibility that disadvantage can be reduced by ensuring that all children living in Canada have cognitively stimulating and emotionally secure environments during their early years.

The high rates of multiple emotional and behavioural problems reveal that one in three children with one emotional or behavioural disorder will have at least one additional disorder and that one in ten children will have two additional disorders. Clinical services for these disorders should take this into account and must be organized so that the front-line personnel are capable of assessing and treating a range of disorders, not just one.

The high rates of multiple problems also have implications for the delivery of services. For example, since nearly half the children with serious educational difficulties (i.e., children who have repeated a grade) also have emotional and behavioural problems, the educational and mental health sectors must work closely together to help these children. A similar co-ordinated effort is needed to help children who have impaired social relationships as three-quarters of these children also have mental-health or educational problems or both.

Lastly, the high rates of one or more problems in the psychosocial domain are striking. The rates for the different age and sex groups ranged from 19.1% to 31.0%. Clinical services alone can never substantially reduce such a high burden of suffering. Clinical services are expensive, they are difficult to deliver to the children (and their families) who need them most, compliance is a problem, and in many instances they have no proven effectiveness.¹⁵

To reduce the burden of suffering from emotional and behavioural problems and co-existing difficulties or morbidities, it will be necessary to have in place a combination of programs including universal programs where all children are offered the intervention, targeted programs where children at high risk are offered the intervention and, lastly, clinical services.¹⁵ Without the first two types of programs present in a community, clinical services will be overwhelmed, and the necessary prerequisites for their success,

such as participation in community life for all children, will be lacking.^{15,16}

The challenge for the NLSCY will be to provide data that will be helpful in reducing the burden of suffering from emotional and behavioural problems and multiple problems. As an example of a descriptive epidemiological study, the NLSCY can make useful contributions in many areas, including the identification of variables that are likely to be causal risk factors for these problems;¹⁷ the ability to target children who are thought to be at increased risk for future difficulties; and the identification of promising elements of interventions for universal, targeted and clinical programs. In any case, a major focus of the NLSCY should be to enable communities in Canada to become more effective in raising the life quality and improving the life chances of their children and youth.

References

1. Institute of Medicine. 1989. *Research on Children and Adolescents with Mental, Behavioural and Development Disorders: Mobilizing a National Initiative*. Washington (DC): National Academy Press.
2. Offord, D. R., M. H. Boyle, P. Szatmari et al. 1987. "Ontario Child Health Study, II: Six-month prevalence of disorder and rates of service utilization." *Archives of General Psychiatry*, 44: 832-836.
3. Offord, D. R., and K. Bennett. 1994. "Long-term outcome of conduct disorder and interventions and their effects." *Journal of the American Academy of Child and Adolescent Psychiatry*, 33: 1069-1078.
4. Offord, D. R., M. H. Boyle, Y. A. Racine et al. 1992. "Outcome, prognosis and risk in a longitudinal follow-up study." *Journal of the American Academy of Child and Adolescent Psychiatry*, 31: 916-923.
5. Lipman, E. L., D. R. Offord, M. H. Boyle et al. 1994. "Relationship between economic disadvantage and psychosocial morbidity in children." *Canadian Medical Association Journal*, 15: 431-437.
6. Offord, D. R., M. H. Boyle, J. E. Fleming et al. 1989. "Ontario Child Health Study: Summary of selected results." *Canadian Journal of Psychiatry*, 34: 483-491.
7. Bird, H. R., M. S. Gould and B. M. Staghezza. 1993. "Patterns of diagnostic comorbidity in a community sample of children aged 9 through 16 years." *Journal of the American Academy of Child and Adolescent Psychiatry*, 32: 361-368.
8. Sanford, M. N., D. R. Offord, M. H. Boyle et al. 1992. "Ontario Child Health Study: Social and school impairments in children aged 6 to 16 years." *Journal of the American Academy of Child and Adolescent Psychiatry*, 31: 60-67.
9. Achenbach, T., and C. Edelbrock. 1981. "Behavioural problems and competencies reported by parents of normal and disturbed children aged four through sixteen." *Monograph on Social Research in Child Development* (Serial No. 188), 46: 1-78.
10. Boyle, M. H., D. R. Offord, H. G. Hofmann et al. 1987. "Ontario Child Health Study, I: Methodology." *Archives of General Psychiatry*, 44: 826-831.
11. Costello, E. J. 1989. "Developments in child psychiatric epidemiology." *Journal of the American Academy of Child and Adolescent Psychiatry*, 28: 836-841.
12. Boyle, M. H., D. R. Offord and Y. Racine. 1993. "Evaluation of the original Ontario Child Health Study Scales." *Canadian Journal of Psychiatry*, 38: 397-405.
13. Statistics Canada (Household Surveys Division). 1994. *Low Income Cut-offs*. Ottawa, Statistics Canada (Catalogue no. 13-551-XPB).
14. Keating, D. P., and J. F. Mustard. 1993. "Social economic factors and human development." In *Family Security in Insecure Times*. Edited by The National Forum on Family Security. Ottawa: Canadian Council on Social Development.
15. Offord, D. R. 1996. "The state of prevention and early intervention." In *Preventing Childhood Disorders, Substance Abuse and Delinquency*. Edited by R. De V. Peters and R. J. McMahon. Thousand Oaks (CA): Sage Publications.
16. Offord, D. R. "Bridging development, prevention and policy." In *Handbook of Antisocial Behavior*. Edited by D. Stoff, J. Breiling and J. D. Maser. New York: John Wiley and Sons (in press).
17. Kraemer, H. C., D. E. Kazdin, D. R. Offord et al. "Coming to terms with the terms of risk." *Archives of General Psychiatry* (in press).

Do Children in Canada Become More Aggressive as They Approach Adolescence?

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The Problem of Youth Violence

The media regularly report on extreme cases of youth violence. The brutal murder, with a baseball bat, of an elderly Protestant minister and his wife in Beaconsfield (Quebec), by three 13- to 15-year-old boys is a good example.¹ Similar well-publicized murders by adolescent boys and girls in Alberta,^{2,3} British Columbia,⁴⁻⁶ Manitoba,⁷ Ontario⁸⁻¹⁰ and Saskatchewan¹¹ give the impression that youths in Canada are becoming more physically violent.¹¹⁻¹³

Official statistics indicate that there has not been any significant increase in youths charged with homicide over the last two decades. However, they also indicate that there has been an increase in police-reported violent crime in Canada over the past decade, and that this increase is greater for youths than for adults.¹⁴⁻¹⁷

Although it appears safer to walk at night on the streets of Canadian cities than on those of American cities, one-quarter of Canadian adults report feeling unsafe walking at night in their neighbourhoods.¹⁸ Most adults will cross the street if they see a group of adolescent boys standing on a street corner at night. There is a general impression that adolescence is the age at which innocent, mild-mannered boys become strong, uncontrolled and aggressive predators.

Finding the causes for this increase in violence during the teenage years should help identify the means of preventing its appearance, or at least of reducing its intensity and its prevalence. Most criminological studies of youth violence have

focused on youths aged 12 to 18. This corresponds to the period of life when children physically grow up to become adults. During that period they become stronger physically, their cognitive competence increases (e.g., they are better at hiding their intentions), they become sexually mature, they ask for and obtain a greater freedom to use their time without adult supervision, and they have access to more resources such as money and transportation, which increases their capacity to satisfy their needs.

This rapid biopsychosocial development might be sufficient to explain why adolescence is a period of life when there are more opportunities to behave aggressively. The pressures to perform in school, to perform within the peer group, to perform with possible sexual partners and to use their newly acquired freedoms could explain why apparently more adolescents than adults resort to violent behaviour.

However, not all adolescents are physically aggressive. Although a majority of adolescents will commit some delinquent acts,¹⁹ most of these will be minor legal infractions. Population-based surveys have systematically shown that a small proportion of adolescents (approximately 6%) accounts for the majority of violent acts and arrests.^{19,20} Of the total number of cases that proceed annually to youth courts across Canada, only 21% involve violence, and in nearly half of these cases the principal charge was a minor assault.²¹ The challenge is to explain why some adolescents frequently resort to physically aggressive behaviour while others do not.

The Perceived Causes and Solutions for Violent Behaviour in Youths

Youth violence has been attributed to many causes. It is unlikely that there is any single factor responsible for such a complex phenomenon. An understanding of individual characteristics, family, friends, schools, neighbourhoods, communities, culture and the immediate situation is probably needed to fully explain violent behaviour.

An increase in media violence is often blamed for creating a culture that tolerates, and sometimes stimulates, violent behaviour.²² People in Canada have been campaigning for the government to impose rules restricting youth access to violent television programs and films.²³ The breakdown of families has also been suggested as a possible cause. Family breakdown creates stress and poverty, and can lead to problems of discipline and supervision; all of these are associated with delinquent behaviour.^{24,25} Lax discipline in schools, the availability of drugs and alcohol and of arms, the ineffectiveness of laws for juveniles and their enforcement have all been suggested as explanations for increasingly violent behaviour among adolescents.²⁶⁻²⁸

The principal solutions that have been proposed for creating a better and safer environment for our youth and ourselves include controlling the availability of drugs, alcohol and guns; enforcing strict discipline in schools; creating jobs; providing economic support to single-parent families; and establishing an ethical code for media violence. In December 1995, Bill C-37 was proclaimed; it altered the Young Offenders Act and the Criminal Code to permit tougher sentences for serious violent crimes such as murder, manslaughter and aggravated sexual assault. Moreover, adolescents accused of committing a serious violent offense who were 16 or 17 when the offense was committed now proceed to adult court unless they can show why their case should continue in youth court.²⁹⁻³²

If the perceived causes of violent behaviour listed above are indeed operating during adolescence, one would expect that their influence began during pre-adolescence and even during childhood. Children are often exposed to television from their first year of life. By the time of their entry into kindergarten they may have been exposed to

numerous depictions of violence. Family breakdown often occurs before adolescence, sometimes during the preschool years. Lax discipline may start in day-care facilities for preschoolers and continue in elementary school as well as in high school.

How the NLSCY Can Help Us Understand Youth Violence

If the main causes of violent behaviour are present in the lives of youth before they reach adolescence, why would violent behaviour peak during adolescence? Many studies indicate that children's violent behaviour starts well before adolescence, and that the most violent individuals during adolescence were already amongst the most violent during childhood.

Official crime statistics are inadequate to describe the development of delinquent behaviour among youth. Many violent incidents are not reported because they are considered too minor. Furthermore, if the aggressive acts were committed by a child below the age of legal responsibility (age 12) the police may choose not to act upon them. Finally, regardless of the nature of the act or the age of the child, adults may choose to bypass the police and deal directly with the child's family or another agency. Therefore, to appreciate the scope of aggressive behaviour among children and youth, population-based surveys such as the National Longitudinal Survey of Children and Youth (NLSCY) are extremely valuable.

The NLSCY presented a number of questions to the person most knowledgeable about the child (PMK, a parent in the vast majority of cases) concerning physically aggressive behaviour and non-physically aggressive behaviour (indirect aggression) among their 2- to 11-year-old children. This gave us an excellent opportunity to look at the development of aggressive behaviour from very early childhood to the beginning of adolescence.

If physically aggressive behaviour is a phenomenon that develops over time as the effects of the media, family adversity, peer influence, and physical and intellectual maturation accumulate, we would expect older children to show more aggressive behaviour than young children. Because adolescent boys have been observed to be more physically aggressive than adolescent girls, we would expect that differences in violent

behaviour between boys and girls would increase with age. However, if we assume that most children become better socialized as they grow older, we would expect that both boys and girls would become less and less aggressive as they age.

The NLSCY provides an opportunity to test these expectations. It allows us to compare developmental trends for children of different socio-economic groups, and thus to determine, for instance, whether children from poor families are more likely to exhibit aggressive behaviour. The NLSCY also allows us to study the effects of family on aggressive behaviour in children by examining the extent to which all children from the same family are more or less aggressive than children from other families.

PMKs were asked to rate the frequency of specific aggressive behaviours for each of their children. These ratings describe a range of aggressive actions, from threats of violence and the destruction of property, to direct physical aggression (hitting and kicking), as well as more subtle forms of aggression. Appendix 1 lists the questions selected for the PMKs of children in the 4 to 11 age group. These items have been used previously in community surveys such as the Ontario Child Health Study³³ to measure the prevalence of aggression and to chart developmental changes in aggression over the course of several years, as in the Montréal Longitudinal and Experimental Study.³⁴⁻³⁶ A child's reliance on indirect aggressive behaviours was also rated. *Indirect aggression* refers to manipulations by the child that are intended to harm or deprive another person while evading direct confrontation. These items describe the extent to which children resort to behaviours such as spreading gossip, excluding someone from a group or setting up another child for punishment.

The reader should keep in mind that the available NLSCY data have some limitations. First, the data are cross-sectional; that is, children have not yet been followed from year to year to provide a description of changes occurring within individuals as they age. However, the data from such a large cohort should provide good estimates of developmental trends. Second, the information on the children's behaviour all came from the same source, namely the person most knowledgeable about the child (PMK), who was usually the mother. Results could be partly due to the particular response style of the PMK. Some PMKs might

report on the behaviour problems of their children more readily than others. Teacher ratings for part of the sample will be available at a later date to check on this potential bias. In some contexts, only the child is able to make reliable reports concerning his or her behaviour. For example, in future NLSCY data-collection waves, children aged 10 years and older will be asked to self-report on their delinquent activities. This will permit us to identify risk factors associated with, or predicting, early criminal involvement. Despite these qualifications, parents' reports of their children's aggressive and disruptive behaviour have been shown to be reliable and valid.^{37,38}

Do Children in Canada Learn to Become More Aggressive as They Grow Older?

To answer this question we compared the mean* scores for boys and girls aged 4 to 11. Figure 1 presents the results of this analysis. It can be clearly observed that the physical aggression of boys and girls decreased in older age groups. By age 11, the boys' average physical aggression score was lower than that of 4-year-old girls. Boys possessed higher physical aggression scores than girls in every age group, including the group of children aged 2 to 3 years.

Figure 1

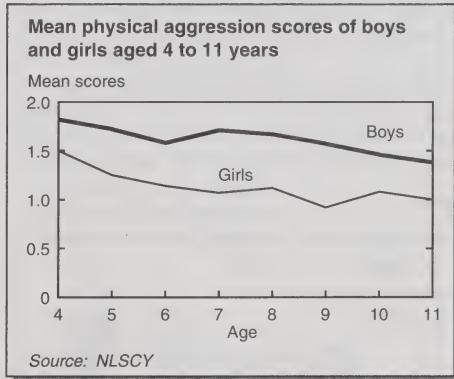
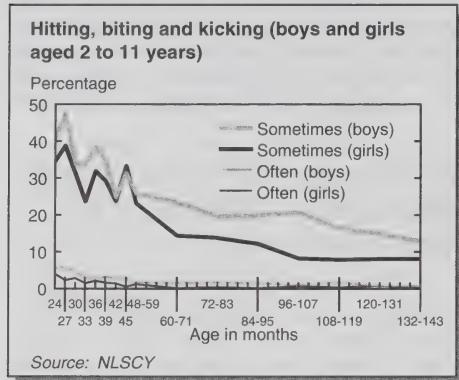


Figure 2 illustrates the frequency of "hitting, biting and kicking" reported by parents for boys and girls aged 2 to 11 years. The age at which the largest proportion of children were reported by parents to "sometimes" or "often" "hit, bite or kick" was at 27 to 29 months. The frequency of this aggression then

* All reported means are weighted means.

decreased steadily with age for both boys and girls. By the age of 11 years, less than 13.7% of boys and 8.3 % of girls were reported to sometimes or often "hit, bite or kick" others. Note that even at its peak (27 to 29 months of age), no more than 53.3% of boys and 41.1% of girls were reported to engage in these behaviours.

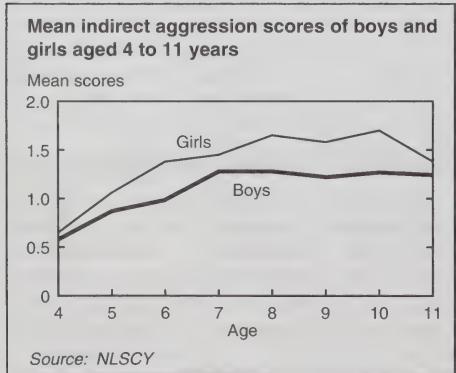
Figure 2



Thus, boys and girls in successively older age groups were reported by the PMKs to be less involved in physically aggressive behaviours. Girls were perceived by the PMKs to be less involved in physically aggressive interactions than boys. These results suggest that the majority of children in Canada benefit from the socializing impact of their families and other socialization agents in their environments.

If children are becoming less physically aggressive as they grow older, is physically aggressive behaviour being transformed into aggression that is not physical? Figure 3 presents

Figure 3



the results for the indirect aggression scale, with reference to age and gender. The average non-physical aggression score increased for boys and girls from age 4 to age 7, and then remained relatively stable up to 11 years of age. The Figure also shows that girls resorted to more indirect aggression than boys between 4 and 11 years of age, a period when the differences in body size between females and males are at their minimum.

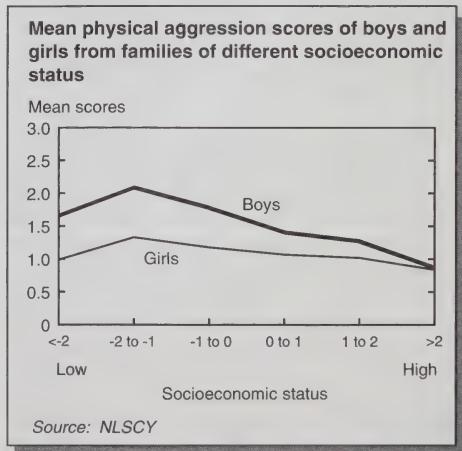
Thus, as they grew older, children interacted less and less in a physically aggressive way, but they used indirect aggression increasingly frequently. At every age, boys were more physically aggressive than girls, while girls showed higher levels of indirect aggression than boys.

Are Children From Socioeconomically Poor Environments More At Risk of Being Aggressive?

Each family was classified in one of six socioeconomic categories, based on the parents' education, occupational status and household income.³⁹ Socioeconomic status (SES) is known to be associated with health, life expectancy and school success.⁴⁰⁻⁴³ To what extent is it related to levels of aggressive behaviour? And if it is related, do these relationships increase or decrease with age?

Figure 4 represents physical aggression scores for boys and girls based on the socioeconomic level of their respective households. Boys and girls from

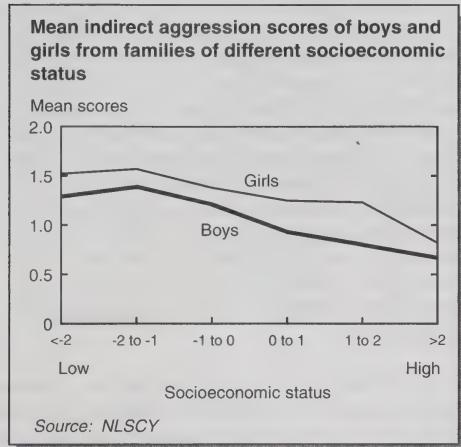
Figure 4



the lowest socioeconomic levels clearly had the highest physical aggression scores. The use of physical aggression differed between boys and girls at every socioeconomic level, with the greatest differences found among children from the lower socioeconomic levels.

Figure 5 shows similar effects at varying socioeconomic levels for indirect aggression. In this case the curve is more similar for males and females, although it shows that girls made use of indirect aggression more often than boys.

Figure 5



Thus, the more socioeconomically disadvantaged the family, the higher the risk that the children will make use of indirect aggression, as well as physical aggression. It is important to note that the effects of living in a socioeconomically disadvantaged family appear very early in children's lives and continue to have the same importance for older children.

To What Extent Are Siblings Similar with Reference to Aggressive Behaviour?

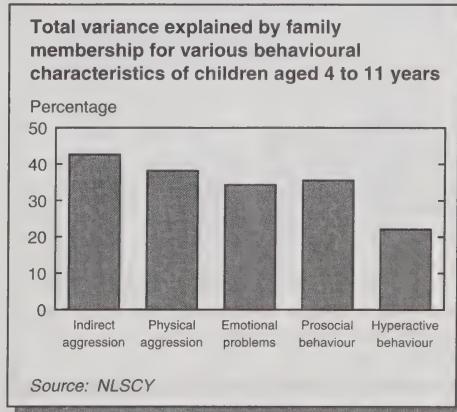
One of the most original features of the NLSCY is that more than one child was assessed in each family with two or more children. If family characteristics have an impact on the development of children's aggressive behaviour, one would expect that children brought up in the same family would show more similar levels of physical aggression than children brought up in different families. Two-level hierarchical analyses were done

to test this hypothesis, using only children who were living with both biological parents or a single parent (16,021 children from 10,287 families). The effect of the family on children's aggressive behaviour was tested after controlling for age, sex, socioeconomic levels, family structure and size.

If the effects of family membership completely determined a child's level of aggressive behaviour, then, after accounting for potential differences related to sex and age, the aggressiveness of any family member could be perfectly predicted using information about the level of aggressiveness of any other family member. In other words, 100% of the variation in aggressiveness (total "variance" in aggressive behaviour) among family members would be explained by family effects. On the other hand, if children from the same family were no more similar in aggressiveness than children chosen at random from unrelated families, then family membership would fail to explain any of the observed variation in aggressive behaviour among family members.

Results of this study indicated relatively strong family effects. The total variance in physically aggressive behaviour explained by family membership was 38%, and the total variance in indirect aggression explained by the family was 43% (Figure 6). As a means of comparison, a similar analysis was performed for hyperactive behaviour, emotional problems and prosocial behaviour (the tendency to help others). Total variance explained by the family was lowest for hyperactive behaviour (22%) and almost identical for emotional problems and prosocial behaviour (34% and 35% respectively).

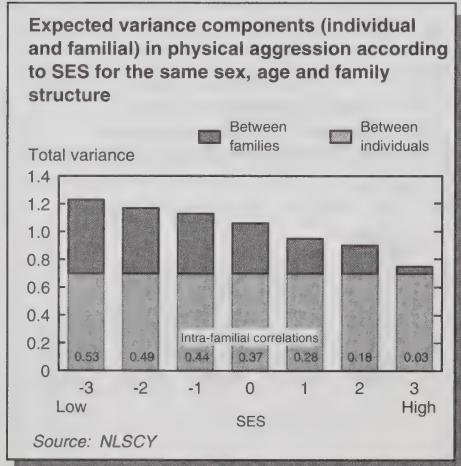
Figure 6



Family influences appear to be most important for aggressive behaviour. Thus, understanding how families influence the development of aggressive behaviour should provide knowledge that families can use to educate their children in the control of aggressive behaviour.

A particularly interesting result of this study is the association between family socioeconomic levels and variation in aggressive behaviour. Figure 7 represents this finding. We observe that the total variation in physical aggression between families becomes increasingly greater as we go from higher socioeconomic status (SES) families to lower-SES families. This means that although average levels of expressed physical aggression are higher at lower SES levels, there is more variation in the use of aggression between children from different lower-SES families. In other words, family influences on aggressive behaviour are greater among families of lower SES than among families of higher SES. This influence results in substantial differences in the average display of physical aggression from one family to the next among lower SES levels. Thus, when compared with unrelated children, siblings within a lower-SES family are more similar in their level of physical aggression than siblings within families of higher socioeconomic status. A very similar pattern was found for indirect aggression, although the increase in between-family variance associated with a decrease in SES level was slightly higher.

Figure 7



Is Aggression Associated with Other Behaviour Problems in the Child?

Besides assessing aggressive behaviour, the NLSCY interview with the PMK (usually the mother) included assessments of behaviours such as hyperactivity, emotional disorder and prosocial behaviour. The relationships between these variables were calculated after controlling for age and sex of the children. The correlations are listed in Appendix 2.

The first set of analyses indicates the extent to which a child's physical aggression level was similar to his or her level on the other behavioural dimensions. The results show that children who were rated high on physical aggression were very likely to be rated high on hyperactivity. They also show that children with high ratings on physical aggression tended to score high on the indirect aggression dimension, high on emotional disorder and low on prosocial behaviour. However, the latter associations were substantially weaker than the association between physical aggression and hyperactivity.

The association between indirect aggression and hyperactivity, emotional disorder and prosocial behaviour were relatively weak. Prosocial behaviour was also very weakly associated with hyperactivity, and was not associated with emotional disorder. A relatively stronger association was found between hyperactivity and emotional disorder.

Thus, physically aggressive children were often hyperactive, they tended to exhibit high levels of indirect aggression and high emotional disorder, and they tended not to help other children (low prosociality).

Is Physical Aggression Associated with Other Behaviour Problems Among Siblings?

The answer to this question can be found by looking at the extent to which the physical aggression of a child was associated with the behaviour problems of the other children in the family. In the previous section it was shown that aggressive children tended to have aggressive siblings. Here we try to

see whether aggressive children had brothers and sisters who were hyperactive, non-prosocial and had emotional disorder. The correlations for similarity of behaviours among siblings are listed in Appendix 3.

The analyses clearly confirm that the physically aggressive children were very likely to have siblings who exhibited high levels of indirect aggression, high levels of hyperactivity and particularly high levels of emotional disorder. We also observed that children who rated high on indirect aggression were likely to have siblings who rated high on hyperactivity and emotional disorder. The children who rated high on hyperactivity were most likely to have siblings who exhibited high levels of emotional disorder. However, a child's level of prosocial behaviour was found to be completely independent of his or her siblings' scores for aggression, hyperactivity and emotional disorder. Thus, children who tended to be aggressive or hyperactive or have emotional disorders tended to have siblings who also had at least one of these problems.

Conclusion

The data on physical aggression from the NLSCY clearly indicate that as the children grew older they resorted less and less to physical aggression in their social interactions. These data are cross-sectional in nature; that is, they do not describe the changes over time for the same individuals, but they confirm longitudinal data from smaller samples in different cultures.^{22,44} The traditional image of mild-mannered, innocent children becoming physically aggressive as they reach adolescence is certainly not confirmed by these studies.¹¹⁻¹³

From our perspective, it can be concluded that as children grow older most learn not to use physical aggression. However, there are children who do not learn, or who do not learn as well as others. Are they the ones most at risk of serious violent behaviour during adolescence and adulthood?⁴⁵ Who are these children? The longitudinal nature of the NLSCY will help answer this question. As children become older it will be possible to characterize those who maintain or increase their aggressive behaviours and those who abandon these behaviours. For the moment we can look only at factors that are currently associated with physical aggression, or that have preceded aggression in the past.

These factors indicated that the children most at risk for frequent physical aggression, independent of age, were boys from families of lower socioeconomic status who had siblings with behaviour problems. This does not mean that aggression was not a problem for some girls. Although girls tended to exhibit less physical aggression than boys, they demonstrated higher levels of indirect aggression. In addition, the effects of age, socioeconomic status and family membership on physical aggression were similar for boys and girls. Thus, the most aggressive girls came from backgrounds similar to the most aggressive boys.

It is important to note that the association between aggressive behaviour (physical aggression and indirect aggression) and family socioeconomic status was a gradient: children from families of high socioeconomic status were rated as less aggressive than children of middle socioeconomic status, while the latter, in turn, were rated as less aggressive than children from families of low socioeconomic status. This finding is echoed in numerous studies that have shown similar gradients for health, life expectancy and school achievement.⁴⁰⁻⁴² These gradients appear to indicate that the more success an individual has in school and in employment, the more likely he or she is to remain healthy and live longer. Results from the present study show that the socioeconomic gradient for physical aggression was already discernible from the third year after birth and did not change as children grew older. From this perspective, preschool learning of control over one's behaviour may play an important role in school success, adjustment to the workplace and good health.^{40,46,47} The follow-up of the younger NLSCY children will provide an excellent opportunity to study these pathways from early childhood circumstances to later quality of life.

If control of physically aggressive behaviour is learned early during the preschool years, it follows that efforts to reduce youth violence should be aimed at helping families with preschool children who fail to foster this control. The children in these families also tend to be hyperactive and have emotional problems. Intervention experiments have shown the limited effectiveness of interventions with disruptive and aggressive youths after the preschool years.^{48,49} A society that intervenes before its children become aggressive youths is likely to make more effective use of scarce public funds. The NLSCY longitudinal database will be useful in

identifying markers for families that need help early in their efforts to educate their children for an increasingly complex world which marginalizes those who cannot control their violent behaviour.

This study was based on reports of children's behaviour by the PMKs, who were parents in the vast majority of cases. Data from other sources are needed to confirm the results. However, several previous studies have shown the validity of parental reports of aggressive behaviours.^{37,38,50} Direct observation of children's behaviour, peer reports and teacher reports have also shown age, sex and socioeconomic differences similar to those observed from the PMKs' reports in this study.^{22,44,51,52} Moreover, it is extremely important to consider parental perceptions of their child's aggressive behaviour because these perceptions will influence the way the parent responds to the child and shapes the child's social development.³⁷

Despite the absence of longitudinal data, the results of this study draw a convincing picture of age-related changes over time. We have described differences between groups of children at different ages, rather than differences within the same individuals over time. As yet we cannot answer many intriguing questions, such as: What are the preschool characteristics of children who remain among the most physically aggressive up to adolescence? To what extent does divorce increase the likelihood that a child will start to behave aggressively in the near or distant future? How does a stress factor such as divorce interact with other pre-existing factors that may themselves lead to maladjustment? Longitudinal data will eventually provide the means to answer these more complex questions. The NLSCY will help us better understand the processes underlying the development of control over aggressive behaviour in order to prevent an increase of youth violence in Canada.

References

1. *Montreal Gazette*. 1995. "Frank and Jocelyn Toope murdered by three boys aged 13 to 15." April 1.
2. *Calgary Herald*. 1995. "Teenage boy convicted of killing Ryan Garrioch." February 2: B1.
3. *Montreal Gazette*. 1995. "Three 14-year-old girls charged with the murder of Kulwarn Dhiman." July 12: A10.
4. *Globe and Mail*. 1995. "Five teens accused in beating murder of Trygve Magnusson, 'The Gentle Giant.'" July 17: A4.
5. *Montreal Gazette*. 1995. "Teenager Jody Larsen is stabbed to death by a group of teens over an insulting remark." April 2: D7.
6. *Montreal Gazette*. 1995. "Six teens accused in beating death of transient James Baldwin." May 1: A9.
7. *Winnipeg Free Press*. 1995. "An adolescent girl is charged in the drive-by shooting death of Joseph Spence." August 26: A16.
8. *Toronto Star*. 1996. "Ishmael Spence, 15, stabbed to death in the subway. A 15-year-old boy is charged with the murder." January 14: A14.
9. *Toronto Star*. 1995. "A 16-year-old girl is convicted in the stabbing death of Brian Harris Baylen." January 30: A18.
10. *Montreal Gazette*. 1995. "Seven teens accused in torture killing of Sylvain Leduc." October 28: A13.
11. Claes, M. 1992. "L'image de l'adolescence dans la presse écrite." *Revue québécoise de psychologie*, 13: 37-50.
12. Falchikov, N. 1986. "Images of adolescence: an investigation into the accuracy of the image of adolescence constructed by British papers." *Journal of Adolescence*, 9: 167-180.
13. Porteous, M. A., and N. J. Colston. 1980. "How adolescents are reported in the British press." *Journal of Adolescence*, 3: 197-207.
14. Carrington, P. J. 1995. "Has violent youth crime increased? Comment on Corrado and Markwart." *Canadian Journal of Criminology*, 37: 61-73.
15. Corrado, R. R., and A. Markwart. 1994. "The need to reform the YOA in response to violent young offenders: confusion, reality or myth?" *Canadian Journal of Criminology*, 36: 343-378.
16. Markwart, A., and R. R. Corrado. 1995. "A response to Carrington." *Canadian Journal of Criminology*, 37: 74-87.

17. Doob, A.N., V. Marinos and K. N. Varma. 1995. *Youth Crime and the Youth Justice System in Canada: A Research Perspective*. Toronto: Centre for Criminology.

18. Sacco, V.F. 1995. "Fear and personal safety." In *Juristat*, 15(9). Statistics Canada Catalogue no. 85-002-XPB. Ottawa: Minister of Industry.

19. Farrington, D.P. 1987. "Epidemiology." In *Handbook of Juvenile Delinquency*. Edited by H. C. Quay. New York: John Wiley & Sons.

20. Baron, S.W. 1995. "Serious offenders." In *Canadian Delinquency*. Edited by J. H. Creechan and R. A. Silverman. Scarborough (ON): Prentice Hall Canada.

21. Statistics Canada. 1996. *Youth Court Statistics 1994-95*. Statistics Canada Catalogue no. 85-522-XPB. Ottawa: Minister of Industry.

22. Cairns, R. B., and B. D. Cairns. 1994. *Life Lines and Risks: Pathways of Youth in Our Time*. New York: Cambridge University Press.

23. *Toronto Star*. 1992. "Million sign teen's petition against television violence." November 17: A2.

24. Loeber, R., and M. Stouthamer-Loeber. 1986. "Family factors as correlates and predictors of juvenile conduct problems and delinquency." In *Crime and Justice: An Annual Review of Research*. Edited by M. Tonry and N. Morris. Chicago: University of Chicago Press.

25. Yoshikawa, H. 1994. "Prevention as cumulative protection: effects of early family support and education on chronic delinquency and its risks." *Psychology Bulletin*, 115: 28-54.

26. Kennedy, L. W., and S. W. Baron. 1995. "Routine activities and a subculture of violence." In *Canadian Delinquency*. Edited by J. H. Creechan and R. A. Silverman. Scarborough (ON): Prentice Hall Canada.

27. Hartnagel, T. F., and S. W. Baron. 1995. "It's time to get serious": public attitudes toward juvenile justice in Canada." In *Canadian Delinquency*. Edited by J. H. Creechan and R. A. Silverman. Scarborough (ON): Prentice Hall Canada.

28. Creechan, J. H. 1995. "A test of the general theory of crime: delinquency and school dropouts." In *Canadian Delinquency*. Edited by J. H. Creechan and R. A. Silverman. Scarborough (ON): Prentice Hall Canada.

29. *Bill C-37: An Act to Amend the Young Offenders Act and the Criminal Code*. 1995. Ottawa, June 22.

30. Creechan, J. H., and R. A. Silverman, editors. 1995. *Canadian Delinquency*. Scarborough (ON): Prentice Hall Canada.

31. Department of Justice. 1993. *Toward Safer Communities: Violent and Repeat Offending by Young People*. Ottawa: Department of Justice.

32. St. Armand, C., and P. Greenberg. 1996. "Youth custody and probation in Canada, 1994-95." In *Juristat*, 16(5). Statistics Canada Catalogue no. 85-002-XPB. Ottawa: Minister of Industry.

33. Offord, D. R., M. H. Boyle, P. Szatmari et al. 1987. "Ontario Child Health Study, II. Six-month prevalence of disorder and rates of service utilization." *Archives of General Psychiatry*, 44: 832-836.

34. Tremblay, R. E., R. Loeber, C. Gagnon, P. Charlebois, S. Larivée and M. LeBlanc. 1991. "Disruptive boys with stable and unstable high fighting behavior patterns during junior elementary school." *Journal of Abnormal Child Psychology*, 19: 285-300.

35. Haapasalo, J., and R. E. Tremblay. 1994. "Physically aggressive boys from age 6 to 12: family background, parenting behavior, and prediction of delinquency." *Journal of Consulting in Clinical Psychology*, 62: 1044-1052.

36. Tremblay, R. E., and B. Schaal. 1996. "Physically aggressive boys from age 6 to 12 years: their biopsychosocial status at puberty." In *Understanding Aggressive Behavior in Children*. Edited by G. Ferris and T. Grisso. New York: Annals of the New York Academy of Sciences.

37. Kingston, L., and M. Prior. 1995. "The development of patterns of stable, transient, and school-age onset aggressive behavior in young children." *Journal of the American Academy of Child and Adolescent Psychiatry*, 34: 348-358.

38. Tremblay, R. E., F. Vitaro, C. Gagnon, N. Royer and C. Piché. 1992. "A prosocial scale for the Preschool Behaviour Questionnaire: concurrent and predictive correlates." *International Journal of Behavioral Development*, 15: 227-245.

39. Willms, D. J., and M. Shields. 1996. "A measure of socioeconomic status for the National Longitudinal Survey of Children." Atlantic Center for Policy Research in Education, University of New Brunswick and Statistics Canada (unpublished).

40. Power, C., O. Manor and J. Fox. 1991. *Health and Class: The Early Years*. London: Chapman & Hall.

41. Marmot, M. G. 1994. "Social differentials in health within and between populations." *Journal of the American Academy of Arts and Sciences*, 123: 197-216.

42. Hertzman, C. 1994. "The lifelong impact of childhood experiences: a population health perspective." *Journal of the American Academy of Arts and Sciences*, 123: 167-180.

43. Willms, J. D. 1992. *Monitoring School Performance. A Guide for Educators*. Lewes: Falmer Press.

44. Tremblay, R. E., L. C. Masse, L. Pagani and F. Vitaro. 1996. "From childhood physical aggression to adolescent maladjustment: the Montréal prevention experiment." In *Preventing Childhood Disorders, Substance Abuse and Delinquency*. Edited by R. D. Peters and R. J. McMahon. Thousand Oaks (CA): Sage.

45. Farrington, D. P. 1994. "Childhood, adolescent, and adult features of violent males." In *Aggressive Behavior: Current Perspectives*. Edited by L. R. Huesmann. New York: Plenum Press.

46. Pulkkinen, L., and R. E. Tremblay. 1992. "Patterns of boys' social adjustment in two cultures and at different ages: a longitudinal perspective." *International Journal of Behavioral Development*, 15: 527-553.

47. Tremblay, R. E., R. O. Pihl, F. Vitaro and P. L. Dobkin. 1994. "Predicting early onset of male antisocial behavior from preschool behavior." *Archives of General Psychiatry*, 51: 732-738.

48. Lipsey, M. W., and D. B. Wilson. 1993. "The efficacy of psychological, educational, and behavioral treatment: confirmation from meta-analysis." *American Psychology*, 48: 1181-1209.

49. Tremblay, R. E., and W. Craig. 1995. "Developmental crime prevention." In *Building a Safer Society: Strategic Approaches to Crime Prevention*. Edited by M. Tonry and D. P. Farrington. Chicago: The University of Chicago Press.

50. Zoccolillo, M., R. E. Tremblay and F. Vitaro. "DSM-III-R and DSM-III criteria for conduct disorder in pre-adolescent girls: specific but insensitive." *Journal of the American Academy of Child and Adolescent Psychiatry* (in press).

51. Noël, J. M., D. Leclerc, and F. F. Strayer. 1990. "Une analyse fonctionnelle du répertoire social des enfants d'âge pré-scolaire en groupes de pairs." *Enfance*, 45: 405-421.

52. Restoin, A., H. Montagner, D. Rodriguez, et al. 1985. "Chronologie des comportements de communication et profils de comportement chez le jeune enfant." In *Ethologie et développement de l'enfant*. Edited by R. E. Tremblay, M. A. Provost and F. F. Strayer. Paris: Éditions Stock/Laurence Pernoud.

Appendix 1. Questions used to assess aggressive behaviour in children aged 4 to 11 years

Physical aggression

How often would you say your child:

1. Gets into many fights?
2. When another child accidentally hurts her/him (such as bumping into her/him), assumes that the other child meant to do it, and reacts with anger and fighting?
3. Physically attacks people?
4. Threatens people?
5. Is cruel, bullies or is mean to others?
6. Kicks, bites, hits other children?

Indirect aggression

How often would you say your child:

1. When mad at someone, tries to get others to dislike that person?
2. When mad at someone, becomes friends with another as revenge?
3. When mad at someone, says bad things behind the other's back?
4. When mad at someone, says to others: let's not be with her/him?
5. When mad at someone, tells the other one's secrets to a third person?

Source: NLS CY

Appendix 2. Correlations among rated behaviours

	1. Physical aggression	2. Indirect aggression	3. Hyperactive behaviour	4. Emotional problems	5. Prosocial behaviour
1. Physical aggression	.59				
2. Indirect aggression	.33 ^a	.56			
3. Hyperactive behaviour	.37 ^a	.21 ^b	.74		
4. Emotional problems	.24 ^a	.19 ^b	.31 ^a	.64	
5. Prosocial behaviour	-.30 ^a	-.14 ^b	-.17 ^b	-.08	.60

Note: Values below the diagonal represent intra-individual correlations, controlling for the effects of the children's age and sex. Values on the diagonal represent within-family variances.

^a p < .01

^b p < .05

Source: NLS CY

Appendix 3. Correlations among siblings on rated behaviours

	1. Physical aggression	2. Indirect aggression	3. Hyperactive behaviour	4. Emotional problems	5. Prosocial behaviour
1. Physical aggression	.37				
2. Indirect aggression	.59 ^a	.41			
3. Hyperactive behaviour	.60 ^a	.55 ^a	.21		
4. Emotional problems	.66 ^a	.51 ^a	.87 ^a	.34	
5. Prosocial behaviour	.05	.01	.09	.03	.33

Note: Values below the diagonal represent intra-familial correlations, controlling for the effects of the children's age and sex. Values on the diagonal represent between-family variances.

^a p < .01

Source: NLS CY

Conclusion

Allan R. Taylor*

The National Longitudinal Survey of Children and Youth (NLSCY) is an ambitious and timely undertaking because it occurs at a critical time in Canada's history when our society and our economy are going through spasms of change and readjustment.

Although this is the first cycle of the survey, including more than 23,000 children from newborn to age 11, I am very impressed by the depth of research, the breadth of expertise brought to the research papers in this publication, and the fundamental recognition that childhood development must be regarded in a more holistic and, indeed, different way.

The way we, as a society, prepare children to become healthy, responsible adults has to change because the economic and social environments have changed.

The NLSCY presents to us an opportunity to learn how well our children are functioning and developing physically, socially and emotionally. The survey also measures many important subjects such as readiness for school, child care arrangements, aggressive behaviour and the effect on the child of single-parent families and step-families.

Implicit in all this seems to be the recognition that there are multiple pathways to healthy human development and that many factors at home, at

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school and in the community, among others, have formative influences on the individual.

As pointed out by many of the analyses in this volume, longitudinal monitoring of the health and development of our children and youth is an essential component in the construction of a learning society which is capable of coping with change.

These findings, and the follow-up that will occur every two years, are the only effective means of keeping track of how we are doing as a society in preparing the next generation for the challenges ahead — a nation's report card, if you will.

Many now agree that to meet the challenges of globalization and the technological revolution, there must be a closer integration of social and economic policy. Therefore, the health, well-being, competence and coping skills of Canada's children and youth are critical for future economic prosperity and the smooth functioning of society.

The importance of these cannot be overstated because a nation's ability to succeed in the innovative, knowledge-driven economy will depend on its human resources — the children who are growing up now.

During the last century, Canada built its wealth and economic prosperity on natural resources. In the next century, our country must rely more on ideas, innovation, inventions and entrepreneurship to spur economic growth and create prosperity. The "knowledge economy" pays a premium to those societies that enrich their "human capital."

In this competitive global economy, the average worker will change jobs and face the challenge of learning new skills eight times in a lifetime.

In the new economy — where the only constant is change — our sons and daughters will need not only to be highly skilled, but also resilient; in other words, they will have to be able to cope with stress and adversity.

How do you inculcate resilience in a child? Resilience is, quite literally, the ability to bounce back; it can consist of such skills and qualities as problem solving, critical thinking, resourcefulness, creativity, optimism and positive self-esteem.

Part of the answer to that question lies in the paper in this volume by Dr. Lynn McIntyre, Dean of the Faculty of Health Professions at Dalhousie University; her findings are supported by other work sponsored by the Canadian Institute for Advanced Research.

Leading neuroscientists have shown that the cerebral cortex — the part of the brain that determines cognitive capacity, competence and coping skills — is "wired" at a very early age. The quality of stimulation and nurturing that a child receives in the critical years from birth to age 3 years has a major effect on his or her competence and coping skills in later life.

This finding has profound significance for our society and for the prioritizing of resources. It means, as a nation, we must become more child-centred if we are to produce healthy, adaptable adults.

In times of economic restraint, it is tempting for governments to cut across the board. But, if we invest wisely in early childhood development, we should see major savings in the future — not just in terms of dollars but in terms of healthier lives and healthier communities, and hence a healthier economy.

Our health and social service systems are now geared to helping children and youth who are in trouble, abused or ill, rather than preventing these problems from arising in the first place.

Rather than dedicating the majority of our resources to putting out fires, we could choose the option of investing wisely at an earlier age so that we can prevent the fires from ever starting.

The evidence on youth violence, crime and antisocial behaviour clearly indicates that prevention is much more economical and effective than later "acute care" intervention.

What is at stake here is not only our children's future but our entire society's future as well.

If we choose to neglect our children's development, large numbers of those children will have entrenched health, academic and social problems and we, as a nation, will fall further and further behind as more and more children and youth fail to achieve the competence and coping skills they need to be productive members of society. The price tag will be high — socially and economically.

So, how to invest wisely? How do we, as a society, provide a stable, nurturing social environment that encourages the healthy development of children?

Rather than relying entirely on governments, I think the answer may lie in innovative approaches by neighbourhoods, communities, schools, day care centres and businesses.

We need to talk more and do more about flex-time, job-sharing, after-school care programs, maternity and paternity leave, community resources, voluntarism — and anything else designed to give our children a rich and vibrant upbringing.

Above all, we must be motivated by the concept of social responsibility because no entity — be it a corporation, a community group or an individual — exists in a vacuum.

From my own experience, I know that many more business leaders now recognize that the quality of the social environment is as important as the quality of the physical environment. We all have an interest in, and benefit from, our social safety net, its health care and education systems and its network of community volunteer organizations.

A time of spending cuts, as we are experiencing now, is the time to seize the initiative, reassess our priorities and then aggressively direct public and private funding in their direction. Childhood development is an excellent place to start.

How will we judge whether we have chosen the right priorities and the most effective courses of action? Fortunately, the NLSCY will give us precise tools to monitor how well we are doing.

It will also give us vital information on how these children make the transition from home to school and to the workplace, and even to having families of their own.

Because of the long lead time for some developmental patterns — such as preschool aggression to adolescent conduct disorder to adult antisocial behaviour — it is essential to have more sensitive detection tools and a better understanding of these crucial transitions.

The first crucial transition for children is their entrance into the school system and here I believe we also need some innovative thinking about what “education” means in a constantly changing, complex social and economic environment.

In the knowledge-intensive economy, education can no longer be confined to the traditional classroom. Lifelong learning has become a necessity as more and more jobs require people who can work in teams, who have high literacy, numeracy and computer skills, who can think critically and creatively and can solve problems — and, most of all, can continue to learn new skills.

The education system will have to redefine itself for the next century. The shift will have to be away from the traditional focus of learning facts towards learning how to learn.

Learning how to solve problems is now more important than just learning facts. The challenge will be to teach our children how and where to find the facts and then what to make of them.

This new focus will mean breaking down the compartmentalization of our education system so workers and learners can flow freely back and forth between the workplace and the classroom. Our aim should be to develop a “community of learners” united in the search for the best way to share ideas, stimulate intellectual growth and solve problems.

Canada needs a learning culture, a research culture and a training culture to keep innovative companies and talented researchers here and to attract them from elsewhere.

That is why we at the Royal Bank Group have committed such a large share of our \$16 million donations budget to research, to education and to projects and organizations which help young people prepare themselves for productive lives in the information age.

At the British Columbia Children’s Hospital, we are funding research into neonatology. At the University of New Brunswick, we are supporting a centre for the study of family violence. At Queen’s University, we are helping a Faculty of Education

program to improve the teaching of math and science in secondary schools. At the Canadian Institute for Advanced Research, we are funding original research into how ideas and knowledge are becoming the critical engines of economic growth; we are also supporting closely related studies being conducted at the Institute in human development and the determinants of health.

In short, philanthropy makes good business sense. If we help Canada’s education, research and community systems work better so that Canadians can achieve better lives, then those Canadians become better neighbours, better citizens, better parents, better managers, better employees, better investors, and better customers. Everyone benefits.

I believe Canada is at a critical juncture. At a time when approximately one in five children lives in poverty, we cannot afford to be complacent.

Now is the time for a commitment to and investment in the healthy development of our youth and children. Our economic prosperity and social stability depend on it.

If we abandon this commitment and turn out a generation ill-equipped to handle the challenges of an increasingly complex economy and a changing society, then we are all at peril.

Perhaps the answer lies in a national declaration of priorities subsequently underwritten with the necessary human and financial resources — both public and private. One of the best long-term equity investments we can make is in our children.

The NLSCY will help us track the development of our children and youth, provide us with insights and help researchers and policy-makers fine-tune their thinking.

But the onus is on all of us to make our society more child-centred, to ensure that all children receive a healthy start, are supported through the upheavals of adolescence, and are fully prepared to grow into healthy, productive, contributing members of society.

Finally, in summary, I would like to quote from the children themselves. In a recent report on Ontario’s children and youth called *Yours, Mine, and Ours*, young people were asked what is required to be healthy. At the top of the list — ahead of food, shelter, clothing, safety and education — came time, patience and love.

A very powerful message.

About the Contributors

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Dr. Keating has written extensively on human development and education, particularly on intellectual and social development throughout life, the developmental sources of human diversity, and the prospects for human development in a learning society. He has contributed over 75 papers to scientific journals and scholarly collections and has written and edited six books, including *Intellectual Talent: Research and Development* and the three-volume *Applied Developmental Psychology*.

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In addition, Dr. Offord is Director of the State-of-the-Child Research Unit funded by the Laidlaw Foundation, which investigates which data on children and youth should be regularly collected to inform and evaluate policies. He has completed pilot work on children's health — particularly their mental health — on two Aboriginal reserves. He is also co-principal investigator of the Tri-Ministry Project.

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Mr. Taylor is committed to strengthening the rapport and interaction between the academic and business communities. He was a founding director and is now an honorary member of the Corporate Higher Education Forum — a national organization of 30 university presidents and 30 corporate executives. He is an advisory board member of many community organizations, including the International Association for Students of Economics and Commerce Canada Inc., the Canadian Foundation for AIDS Research, the Canadian Association for Community Living, and the Canadian Journalism Foundation, Incorporated. Mr. Taylor is also a governor of Olympic Trust of Canada, an executive advisor of the Public Policy Forum, and Chairman of the Patrons Council of Outward Bound Canada.

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Technical Appendix

The National Longitudinal Survey of Children and Youth (NLSCY) is a long-term survey designed to measure child development and well-being. It is being conducted by Statistics Canada (STC) on behalf of Human Resources Development Canada (HRDC). The primary objective is to develop a national database on the characteristics and life experiences of children in Canada as they grow from infancy to adulthood. This database should become a useful tool for government agencies, academics, community groups, schools and others in determining program ideas, analysing current policies, and determining areas requiring further research.

The first cycle of the NLSCY (Cycle 1) was conducted in 1994-1995. The research papers presented in this publication are based on data from Cycle 1 of the survey. This Technical Appendix provides details on the survey's background and objectives, sample design and content, as well as measures of response rates.

Readers may also wish to consult other documents regarding Cycle 1 of the NLSCY:

- *NLSC Overview of Survey Instruments for 1994-95 Data Collection* provides further information and the rationale for the survey's content and development.
- *NLSC Survey Instruments for 1994-95 Data Collection* contains all of the questionnaires and instruments used for Cycle 1.

This first release of NLSCY Cycle 1 data consists of three products: this publication; the microdata tape itself; and the *NLSCY User's Handbook and Microdata Guide* (or *User's Guide*). The *User's Guide* contains extensive technical information on how to use the microdata, the survey methodology, survey content, comparisons of

NLSCY data with other data sources, and data quality indicators.

1. Background and Objectives of the Survey

Before the NLSCY was undertaken, there were few statistical studies describing a broad range of characteristics of children in Canada. However, measures of health, well-being and life opportunities are needed if governments and researchers are to learn more about the ongoing life conditions and developmental experiences of children and youth in Canada. Longitudinal data are central to discovering developmental changes in children over time and to studying the impact of the child's social environment and various family-related factors.

Data on the prevalence of and interaction among various characteristics and conditions will help policy-makers understand the processes that modify risk and that protect and encourage children's healthy development. With such information, the various partners in society can develop effective strategies, policies and programs to help children succeed in our changing society.

Therefore, the NLSCY's primary objective is to develop a national database on the characteristics and life experiences of children and youth in Canada as they grow from infancy to adulthood. More specific objectives include:

- to determine the prevalence of various biological, social and economic characteristics and risk factors among children and youth in Canada;
- to monitor the impact of such risk factors, life events and protective factors on the development of these children;

- to provide this information to policy and program officials for use in developing effective policies and strategies to help young people live healthy, active and rewarding lives.

Underlying these objectives is the need to:

- fill an existing information gap regarding the characteristics and experiences of children in Canada, particularly in their early years;
- focus on all aspects of the child in a holistic manner (i.e., the child and his/her family, school and community);
- provide national-level and, as far as possible, provincial-level data;
- explore subject areas that are amenable to policy intervention and that affect a significant segment of the population.

2. Survey Design

The requirement for the NLSCY design was to select a representative sample of children in Canada and to follow and monitor these children over time. For Cycle 1, the sample consisted of children who were newborn (0 years) to 11 years old. The long-term goal of the NLSCY is to follow these children into adulthood.

The Household Sample

In terms of sampling, the starting point was the household. Sampled households came from three possible sources that have been labelled the *main component*, the *integrated component* and the *territories component*.

Main Component

For Cycle 1 of the NLSCY, the requirement was to select households that included at least one child aged 0 to 11 years. A method had to be found to facilitate finding such households, otherwise precious dollars would have had to be spent screening households to identify those with children. The answer lay in Statistics Canada's Labour Force Survey (LFS).

The LFS, conducted on a monthly basis, collects basic demographic information about all household members and labour-market information about the adults in the households, which are representative of the Canadian population. Households that were currently or had recently

been in the LFS sample were examined to determine which of them included children. This served as the basis of the household sample for the NLSCY's main component. Approximately 12,900 households were selected for the main sample.

It should be noted that the LFS excludes certain populations that are not part of the LFS sample frame, specifically, individuals living in the Yukon or Northwest Territories, individuals living in institutions, and individuals living on Aboriginal reserves. To compensate for the exclusion of the Yukon and Northwest Territories, the NLSCY introduced the territories component (described below). The under-coverage that resulted from the other exclusions (i.e., institutions and Aboriginal reserves) represents approximately 0.5% of children aged 0 to 11 years living in the ten provinces.

Integrated Component

At the same time as the NLSCY was being designed, Statistics Canada was launching another national longitudinal survey: the National Population Health Survey (NPHS). Its purpose is to produce estimates of Canadians' physical and mental health and to identify the factors that determine good and poor health.

Because both the NLSCY and NPHS had to collect data on the health of Canadian children, it was decided that a portion of the two surveys' sample and content would be integrated in the ten provinces. The children selected by the NPHS will be part of the sample for both surveys.

As in the main component, the integrated component's households were selected on the basis of the LFS frame.* However, this was a fresh sample selected specifically for the NPHS as opposed to households already participating in LFS. For Cycle 1 of the NLSCY, in a certain portion of the NPHS household sample, one household member was randomly selected with no restriction on age; thus, everyone in the household, including children, had an equal chance of being selected. If the selected person was aged 0 to 11 years, the household was considered part of the integrated sample and the NLSCY interview was conducted in that household; otherwise, only the NPHS

* In Quebec, the sample drawn for the integrated component was a sub-sample of dwellings from a 1993 health survey conducted by Santé Québec.

interview was conducted. Approximately 2,700 households were selected for the integrated component.

The exclusions discussed above for the main component (i.e., the Yukon and Northwest Territories, institutions and Aboriginal reserves) also apply to the NPHS component.

Territories Component

The household samples for the main and integrated components were both based on the LFS sample frame, which excludes the Yukon and Northwest Territories. However, both the NLSCY and NPHS required estimates for northern areas. Therefore, the territories component — which is an integrated sample for both the NLSCY and NPHS — was introduced. The sample for the territories component was drawn from the population of privately occupied dwellings. The Yukon sample excludes institutions and unorganized areas. The Northwest Territories sample has the same exclusions and also excludes remote areas and very small communities.

In the territories sample, if there was at least one child aged 0 to 11 living in a selected dwelling, the NLSCY interview was conducted for that dwelling. The goal for Cycle 1 was to produce a sample that would yield data for approximately 2,300 children living in the Yukon and Northwest Territories.

The territories component differs from the other components in that it is fully integrated with the NPHS. In households with children, the NLSCY was administered for up to three children and one person in each household was selected at random for the NPHS. In Cycle 1, if that randomly selected person was aged 12 years or older, the NPHS was administered. Consequently, it was necessary to reduce the content of both surveys to lower the response burden. The collection methodology was also somewhat different.

All research papers in this publication are based on data from the ten provinces and exclude data from the Yukon and Northwest Territories. Data for the territories have not yet been processed; they will be part of a future release in 1997. When Yukon and Northwest Territories' data are released, the *User's Guide* for that release will include a full discussion of the sample design and content of the territories component.

In the remainder of this Technical Appendix, all discussion will be limited to the design and content for the ten provinces (i.e., the main and integrated components). Similar information about the territories component will be included in future publications when that component's data are released.

The Child Sample

Once the NLSCY sample of households had been selected, the next step was to select children.

In the main component, a random selection was made of one child aged 0 to 11 years who lived in a selected household the majority of the time. Other children in the same economic family¹ as this selected child were then selected at random, up to a maximum of four children per household.

In the integrated component, a child had already been selected in each household (as described above). As in the main component, additional children in the same economic family were selected at random for a maximum of four children aged 0 to 11 years per household.

Sample Allocation

Two important requirements were considered while constructing the Cycle 1 sample. A sufficient sample was required in each province to allow production of reliable estimates for all children aged 0 to 11 years. The sample allocation was therefore derived so that the smaller provinces had a sufficient sample to meet this requirement.

The second requirement was to have a large enough sample to produce national-level estimates broken down by certain key age groupings (cohorts): 0 to 11 months, 1 year, 2 to 3 years, 4 to 5 years, 6 to 7 years, 8 to 9 years, and 10 to 11 years. These groupings will permit analysis, broken down by the age cohorts, every two years while maintaining an overemphasis in the youngest age groups (children aged 0 to 11 months and 1-year-olds), which was a requirement for the survey. In the NLSCY main component, it was possible to over-sample households that contained at least one child in the two youngest age groupings so that the sample requirements for those age groups could be met.

¹ For the NLSCY, an economic family is defined as all family members related by blood, marriage, common-law relationship or adoption; foster children are considered to be part of the economic family.

Section 4 of this Technical Appendix gives numbers for the responding sample by province and age group.

Cross-sectional and Longitudinal Estimates

The NLSCY design and sample were constructed to permit production of both cross-sectional and longitudinal estimates. Cycle 1 data permits only cross-sectional estimates. Longitudinal information will become available once Cycle 2 results are also available.

As mentioned above, the allocation of the Cycle 1 sample makes it possible to produce estimates at the national level for the specific age cohorts and at the provincial level for aggregated age groups. This is true for both cross-sectional and longitudinal data.

3. Data Collection

Cycle 1 data collection took place between fall 1994 and spring 1995. Information was collected from a variety of respondents using different collection methodologies. The respondents and data collection formats are summarized below; the nature of the information obtained from each respondent is presented in more detail in Section 5.

Cycle 1 data were obtained in household and in school collections.

Household Collection

The main respondent in Cycle 1 was a household member who was the "person most knowledgeable" (PMK) about the child or children. In most cases the PMK was the child's mother, so the PMK is referred to as "she" in the remainder of the Technical Appendix. See the Glossary for more information about PMKs.

The PMK provided very basic demographic information about all household members, extensive information about each selected child, and socioeconomic information about herself and her spouse. This information was collected in a face-to-face or telephone interview using computer-assisted interviewing (CAI); questions were asked of the respondent in her home or by telephone and were entered directly into a computer by the interviewer. The use of CAI allowed some on-the-

spot edits and basic quality checks to detect and correct errors, with the PMK's help if necessary.

To measure the school readiness of 4- and 5-year-old children in the sample, the interviewer administered the Peabody Picture Vocabulary Test - Revised (PPVT-R; see the Glossary at the end of the Technical Appendix for a full description of the PPVT-R and the equivalent test for French-speaking children). The test had to be administered face-to-face with the child, so CAI was used during this portion of the survey only to compute the results.

Children aged 10 to 11 years were asked to fill out a self-completed questionnaire, in most cases while the PMK was being interviewed. After the PMK's permission for the child to complete the questionnaire was obtained, the child was given some basic instructions and encouraged to complete the questionnaire in a private setting. When complete, the questionnaire was sealed in an envelope to ensure the confidentiality of the child's responses. Neither the PMK nor the interviewer was permitted to look at the completed questionnaire. The plan for future cycles is to collect more information directly from the older children rather than from the PMK.

School Collection

School collection is another very important element of the NLSCY. For all children in the Cycle 1 sample who were of school age and attending school at the time of the PMK interview, the PMK was asked to give written permission for information to be collected from the child's teacher and principal. For children in Grade 2 and above, permission was sought from the PMK for the teacher to administer a short mathematics computation test to the child. Questionnaires and math tests were mailed to and returned by the teachers and principals of the children who were in school.

Survey Timing

The initial plan was to have four collection periods for the household component. Data for the main component were to be collected in December 1994 and February 1995. Data for the integrated component were to be collected in November 1994 and March 1995 to coincide with NPHS collection periods. The main and integrated samples were split between the two potential collection periods. Each of the four collection periods lasted approximately two weeks.

The narrow collection periods and the personal interview requirements resulted in a response rate that was lower than expected. Two back-up procedures were established in response to this situation. One was to allow the sample to be carried forward to a future collection period in the case of a non-response. For example, if a household could not be reached in December 1994 because no one was at home during the entire collection period, the household was included again in the February 1995 sample, when further attempts at contact were made.

At the end of the four collection periods, it was decided that the response rate could be further improved if more effort was placed on converting non-respondents. In June 1995 all non-responding cases (for whatever reason, e.g., no one at home, refusal, etc.) were contacted again to try to convert them into respondents.

The school collection activities took place from March to June 1995. The responding households that were part of the June 1995 follow-up were excluded from the school collection.

4. The NLSCY Responding Sample

Children in Responding Households

Collection during Cycle 1 resulted in a responding sample of 13,439 households from which 22,831 children aged 0 to 11 years were selected to participate in the NLSCY. Tables 1 and 2 below provide a breakdown of these children by age and by province.

Response Rates

In total, 15,579 households were selected to participate in the NLSCY. A response was obtained for 13,439 of these selected households, which results in an overall response rate of 86.3%.

There is a potential source of bias in the NLSCY main component due to the method of sample selection used. As discussed in Section 3, the main component was selected from households that had participated in the Labour Force Survey (LFS). Households that included at least one child aged 0 to 11 years at the time of the LFS interview were

Table 1. NLSCY children in responding households by age

Age in years	Sample	Total estimated children ^a
0	2,227	370,887
1	2,469	381,711
2	1,963	406,520
3	1,946	385,234
4	1,935	416,075
5	1,793	383,989
6	1,800	381,753
7	1,750	381,879
8	1,780	394,721
9	1,734	388,328
10	1,766	412,132
11	1,668	370,161
Total	22,831	4,673,390

^a "Total estimated children" are weighted values of the sample data.

Source: NLSCY

Table 2. NLSCY children in responding households by province

Province	Sample	Total estimated children ^a
Newfoundland	1,232	89,533
Prince Edward Island	764	23,161
Nova Scotia	1,532	144,744
New Brunswick	1,426	115,913
Quebec	4,065	1,099,033
Ontario	6,020	1,777,525
Manitoba	1,789	183,268
Saskatchewan	1,878	176,449
Alberta	2,185	489,604
British Columbia	1,940	574,160
Ten provinces	22,831	4,673,390

^a "Total estimated children" are weighted values of the sample data.

Source: NLSCY

selected for the NLSCY. This sampling methodology resulted in two problems.

The first is that only LFS respondents were considered for the NLSCY main component. It could be that some LFS non-respondents had children in the target age group, but these households were not included in the NLSCY sample. The LFS response rate was approximately 95% during the time period in which the NLSCY sample was selected. It is estimated that approximately 700 households with children were missed because no attempt was made to contact non-responding LFS households.

A second complication arose because the NLSCY sample included only households in which there were children at the time of the household's involvement in the LFS. Of households that were vacant or that included only members aged 12 and older at the time of the LFS, some may in fact have included children aged 0 to 11 at the time of the NLSCY. It is estimated that this caused approximately 240 households with children to be missed in the NLSCY sample.

A total of 3,080 households were missed due to either non-response to the NLSCY interview (2,140 households) or the two problems just discussed (940 households). A completed interview was obtained for 13,439 households, which represents 81.4% of the total households estimated to have children aged 0 to 11 years.

5. Survey Instruments and Content

The NLSCY was designed to follow an ecological or holistic approach to measuring child development. The survey captures the diversity and dynamics of the factors affecting child development. To ensure that all relevant topic areas were adequately addressed by the survey, a multidisciplinary consultation was carried out at its inception. The selection of specific subject areas, priorities and survey questions was a group effort by STC and HRDC with input and advice from:

- the NLSCY expert advisory group and other researchers in the areas of child development and the social sciences;
- federal departments;
- representatives from the provinces and territories responsible for child development programs.

The recommendation was that the NLSCY cover a broad range of characteristics and factors affecting child growth and development. Extensive information was gathered about the child, family members and the neighbourhood.

In the Glossary included in this Technical Appendix, some of the major concepts and variables addressed in the NLSCY are presented, along with technical information on how they were measured or derived.

Unit of Analysis

The unit of analysis for the NLSCY is the child (and eventually the young adult). During each cycle, extensive information will be gathered on the child's family, parent(s) and neighbourhood. While families or households are relatively straightforward units of analysis for cross-sectional data, the situation becomes quite problematic for longitudinal data. Households change composition frequently (e.g., due to parents' divorce or children's departure from the parental home). Other studies have attempted to define "longitudinal households," but implementing this concept has never been straightforward. No single definition has been found that will fit most analytic tasks. As well, many definitions exclude the portion of the population that has undergone the change, which is often both a significant and an interesting population for study.

It has been suggested that a superior alternative is to use the individual as the unit of analysis and to present family and household variables as characteristics of the individual.[‡] The file constructed for the NLSCY therefore consists of child records. To understand the family situation, estimates such as the number of children in single-parent families or in low-income households can be produced.

Survey Instruments

Data were collected from several respondents using a variety of survey instruments. Figure 1 presents a schematic of the survey instruments. As indicated, some of the instruments were administered using computer-assisted interviewing, while others involved a self-completed questionnaire. The mathematics computation test was administered as a self-completed questionnaire, while the PPVT-R involved computer-assisted interviewing.

A brief description of each of the survey instruments and a summary of their content is presented below.

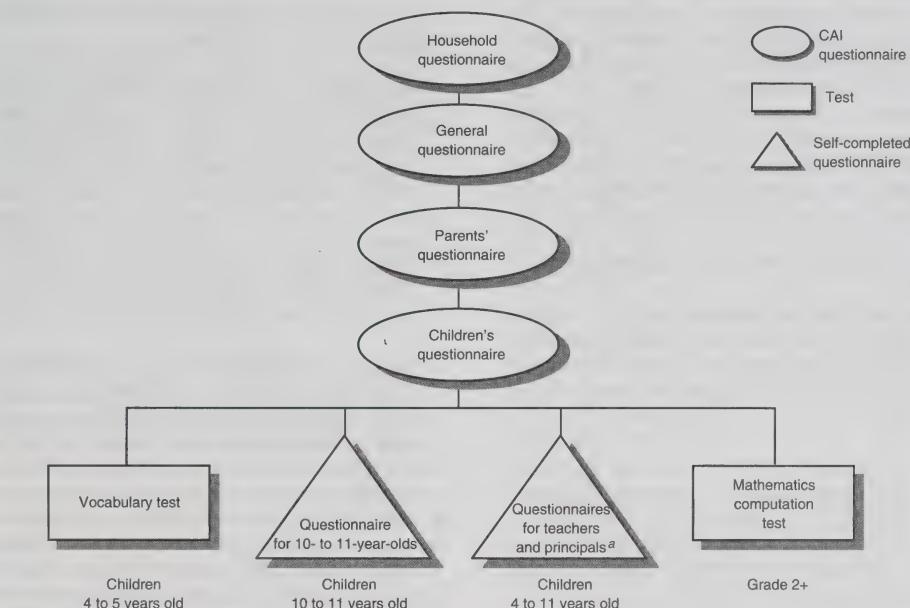
Household Questionnaire

The household record was completed with a knowledgeable household member and included

[‡] For a more complete discussion of units of analysis for longitudinal studies, see Duncan, G.D., and M.S. Hill (1985), "Conceptions of longitudinal households: fertile or futile?" *Journal of Economic and Social Measurement*, 13: 361-375.

Figure 1

NLSCY survey instruments (provinces)



^a Data not yet available

basic demographic information for each household member and questions on dwelling conditions. Using the information on family relationships, it was possible to derive a series of variables to describe the child's family situation.

General Questionnaire

The general questionnaire was designed to collect socioeconomic information about the PMK and her spouse (e.g., education, labour force activity and income). The PMK was usually the respondent for this questionnaire, providing information on both herself and her spouse.

Parents' Questionnaire

The purpose of the parents' questionnaire was to gather general health information on both the PMK and her spouse, as well as general information on the child's social environment (e.g., social support, family functioning and neighbourhood characteristics). This information was generally collected from the PMK.

Children's Questionnaire

The children's questionnaire was completed for a maximum of four children aged 0 to 11 years in the household. Again, the PMK usually completed this portion of the interview. Content varied with the age of the child, but the main topics were health, perinatal information, temperament, education, activities, behaviour, motor and social development, social relationships, parenting practices, child care, and family and custody history.

Vocabulary Test

To measure the school readiness of children aged 4 to 5 years, the Peabody Picture Vocabulary Test - Revised (for English-speaking children) or the Échelle de vocabulaire en images (for French-speaking children) was administered by the interviewer. The PMK's verbal permission had to be obtained before the test could be administered.

Questionnaire for 10- and 11-year-olds

Children in the NLSCY sample who were aged 10 to 11 years completed a questionnaire. The objective was to collect information directly from the children in this age group on a variety of aspects of their life. The children's responses could supplement or, in some cases, be compared with information obtained from the PMK and the child's teacher. The main topics covered were relationships with others, behaviour, school experience, views on parents, smoking, and alcohol and drugs.

Questionnaires for Teachers and Principals

The teacher questionnaire was designed to collect information about the child's academic achievement and behaviour at school and about characteristics of the class and the teacher's instructional practices.

The questionnaire for principals gathered information on the school environment to assess how it may affect child development. Consequently, this questionnaire collected information on school policies and educational climate, rather than data about a specific child.

Mathematics Computation Test

A short mathematics computation test of 10 to 15 questions was administered to children in Grade 2 and above.

6. NLSCY Data Product

A public-use microdata file containing NLSCY Cycle 1 data is available for purchase from Statistics Canada.

This first microdata file is a flat file with one record for each responding child in the sample. Each record includes the data collected on the child,

along with the variables collected on his or her parents and family.

The microdata file does not include all the data collected in Cycle 1 because:

- the amount of information collected was so extensive, it was decided to have two separate releases rather than waiting for all the data to be processed. The second release will be in 1997. Notable elements of the second release will include health variables for the child and parents, the child's custody history, and the data collected from teachers and principals. The *User's Guide* contains a complete list of the sections in both the first and second releases.
- Statistics Canada is bound by law to protect the confidentiality of survey respondents. As a result, it was necessary to collapse or suppress some variables on the public-use microdata file. For example, detailed income variables could not be put on the microdata file, so income ranges have been provided instead. Other measures were also taken to protect confidentiality, all of which are discussed in the *User's Guide*. However, users may still obtain data from the unscreened NLSCY data file by requesting custom tabulations from Statistics Canada.

For more information about the NLSCY microdata file, please contact:

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Glossary of Major Survey Concepts and Variables

Certain key variables or concepts are used frequently in the data analyses and interpretations contained in this publication. Rather than defining these concepts in each research paper, below is an alphabetic summary that includes some technical information on how they were derived from NLSCY data.

Controlling for

Any one of several ways of statistically subtracting the effect of a control variable to see what a relationship would be without it.

Correlation

The degree of interdependence between data, that is, the extent to which two variables vary together. Two variables are “positively correlated” when high values in one variable occur with high values in the other or when low values in one occur with low values in the other. Conversely, two variables are “negatively correlated” when high values in one variable are associated with low values in the other and vice versa. For example, there is a known positive correlation between a mother’s health during pregnancy and her infant’s health at birth. These two variables vary together (i.e., healthier mothers tend to have healthier babies).

Cross-sectional survey

A survey in which data are collected from a cross-section of a population at a single point in time. The NLSCY is actually both cross-sectional and longitudinal. Cycle 1 data are cross-sectional. They provide a “snapshot” description of how children in Canada are faring, in terms of both the characteristics of the sample and the relationships among different variables in the population. For example, cross-sectional data from Cycle 1 will tell us how many children were living in a single-parent family at the time of data collection in 1994–1995. Because cross-sectional data are from a particular point in time, they cannot be used to argue causal relationships or hypothesize about change over time.

Cross-tabulation (crosstabs)

Cross-tabulations (or crosstabs) are a way of presenting data about two variables in a table such that their relationship becomes more obvious (see, for example, Table 2.3 in the research paper

“Overview: Children in Canada in the 1990s” in this publication).

Family

Using NLSCY data, a child’s family may be described in several different ways. Many of the family variables used to describe the NLSCY children were derived from what is known as the “relationship grid.” Basic demographic information was collected about all members of the child’s household during the household interview, including the relationship of each household member to all other members. This information made it possible to create an extensive set of variables to describe the child’s family situation. Some of the family concepts used in this publication are described below.

Blended, step- and intact families

Children living with two parents are classified as members of intact, step- and/or blended families based on their relationship to the parents. Foster children and children living with only one parent are not included in intact, step- and/or blended families. In the derivation of intact, step- and/or blended, a child who was the adoptive child of one parent and the biological child of the other parent was treated like a stepchild; the family was thus labelled a step-family. In other Statistics Canada publications, such children are treated as if they were the biological child of both parents.

Blended family

Blended families combine children who have different relationships with their parents. A blended family consists of a married or common-law couple residing in the same household with at least two children, one of whom does not share the same biological and/or adoptive parents as the other child(ren). Following are examples of blended families:

- a couple with biological children of the female partner as well as biological children of the male partner (i.e., hers and his)
- a couple with biological children of the female partner as well as children from the new union (i.e., her children and theirs).

The blended family is a sub-set of the step-family. Of NLSCY children, 6.1% were a member of a blended family.

Economic family

In the NLSCY, an economic family is defined as all family members related by blood, marriage, common-law relationship or adoption; foster children are considered part of the economic family. For example, if a woman lives in a household with her spouse and two children as well as her sister and her sister's child, all these individuals would be part of one economic family. If a boarder also resided in the household with her child, these two people would constitute a second economic family.

Intact family

An intact family consists of a married or common-law couple residing in the same household whose children are all the biological and/or adopted offspring of both members of the couple. Of NLSCY children, 75.5% were members of an intact family.

Siblings

In the NLSCY, siblings include full-, half-, step-, adopted and foster siblings. Only siblings residing in the household were included in the calculation of sibling-derived variables used in the research papers. In the case of common-law relationships, if both members have brought their own children into the relationship, those children were considered siblings. It should be noted that the classification of siblings was age-independent: if an NLSCY child had an adult sibling (for example, aged 21 years) living in the household, this sibling was included in the calculation of sibling-derived variables.

Single-parent family

There are two ways of describing the parental situation of children using NLSCY data:

1. A child's status in terms of parents can be derived using the relationship grid: 84.2% of children lived with two parents, 15.6% with one parent, and 0.1% without a parent.
2. A child's status in terms of parents can also be defined on the basis of the PMK: 85.6% of the NLSCY children lived in a household

where the PMK had a spouse; and the PMK of 14.4% of children did not have a spouse.

The two ways of describing the child's family are very similar. The reason for the small differences is the few cases in which the child lived with a parent, but the parent was not the PMK.

Step-family

A step-family consists of a married or common-law couple residing in the same household who have at least one stepchild living with them who is the biological or adopted child of one parent but not of the other parent. It should be noted that a child who is the biological child of both parents is said to belong to a step-family if at least one of these parents has a stepchild residing in the household. Of NLSCY children, 8.6% lived in a step-family, with 4.3% actually being stepchildren.

Gradient

A measure of the extent of inequality between individuals of differing socioeconomic status in a given outcome (e.g., school achievement, aggression, etc.). A shallow gradient indicates lower levels of class inequality, while a steep gradient reveals higher levels of inequality among individuals of different socioeconomic classes.

Income

Used frequently within this publication to describe the child's socioeconomic situation. For the most part, income data are presented by describing the income range of the household in which the child resides. This was collected by asking the PMK to give her best estimate of the total income, before taxes and deductions, of all household members in the previous 12 months. If the PMK was unable or unwilling to estimate household income, an attempt was made to obtain a range within which the household income fell. The PMK provided an exact amount for household income in 81.9% of cases, an income range in 14.4% of cases, and no household income information in 3.7% of cases. When only a range or no information was provided, an exact amount was estimated (i.e., imputed).

The objective of the NLSCY income questions was to provide a broad indicator of the child's economic situation. Using only one question to estimate total household income does not produce

data of the quality obtained through an extensive series of questions on amount of income from all possible sources for each household member. Comparisons of NLSCY income data with, for example, data from Statistics Canada's Survey of Consumer Finance (SCF) show that the NLSCY underestimated household income.

A complete description of the imputation process used for income, as well as details on the comparison made with SCF data, can be found in the *User's Guide*.

It should be noted that the PMK was also asked to estimate her own personal income; this information was not used in any of the research papers in this publication.

Income ratio

Some of the research papers classified children as living in households of various income levels by calculating an income ratio. The following is a description of how this ratio was calculated.

Every year Statistics Canada establishes what are known as "low income cut-offs" (LICO) which are derived by considering expenditure-to-income patterns observed in the most recent Family Expenditure Survey. These values are calculated for different urban-size and family-size categories and are updated annually using the Consumer Price Index.

The low income cut-offs derived for 1994 were used to calculate the NLSCY income ratio. The ratio was simply the household income divided by the cut-off value. Two data quality issues should be raised regarding this income ratio. One is that the cut-offs are based on economic family income, while the NLSCY collected information on household income rather than economic family income. However, in 98.5% of the sample households, the two concepts were equivalent (i.e., there was only one economic family in the household). A more important data quality issue is that the number of children estimated to live in households with an income below the cut-off is overestimated because household income was underestimated in the NLSCY.

Indicator

A concrete representation of an abstract variable. Indicators are a way of representing an abstract variable

(such as child health or well-being) that could not otherwise be measured. For example, low birth weight is often used as an indicator of child health. Scores on the Peabody Picture Vocabulary Test - Revised can be used as an indicator of school readiness.

Longitudinal survey

A survey in which data on the same groups of subjects are collected at intervals over time. In the NLSCY, it is planned that the same group of children and youth will be surveyed every two years. The NLSCY's longitudinal format will make it possible to describe changes over time for the same individuals, allowing researchers to clarify the sequence of factors leading to particular outcomes. This may make causal inference easier. The NLSCY makes it possible to examine various demographic characteristics and "inputs" and subsequent developmental outcomes. This will help researchers determine which patterns might be amenable to intervention and prevention.

As we follow the same group of children in future cycles, we will be able to track changes within individuals as they age. In addition, longitudinal data will let us trace the movement of children through different family types and will tell us, for example, how many children spend some time in a single-parent family. Similarly, it will be possible to determine the amount of time a child spends in a low-income family, and the depth, duration and longer-term effects of poverty.

Mathematics computation test

All NLSCY children in Grade 2 and above were to complete a mathematics computation test. During the household interview, the PMK's consent was sought for the child's teacher to administer a shortened version of the Mathematics Computation Test of the standardized Canadian Achievement Tests, Second Edition (CAT/2). CAT/2 is a test series designed to measure achievement in basic skills. The mathematics computation test measures a student's understanding of the operations of addition, subtraction, multiplication and/or division of whole numbers. The shortened test developed for the NLSCY was a ten-minute test for children in Grades 2 and 3 and a 15-minute test for children in higher grades. Three versions of the test were administered in Cycle 1: children in Grades 2 and 3 were given the level 2 test; children in Grades 4 and 5 were given the level 4 test; and children in Grades 6 and 7 were given the level 6 test.

Every child who completed the test was assigned a raw and a standard score. A raw score was calculated by simply adding the number of correct responses on the test. Standard scores were developed based on a sample of children across all ten Canadian provinces, referred to as the norm sample. Grade 2 and 3 children in the norm sample who took the level 2 test were assigned standard scores in the 200 to 400 range (approximately) based on the number of correct responses on the test (i.e., the raw score). Grade 4 and 5 children who took the level 4 test were assigned standard scores in the 264 to 550 range. Grade 6 and 7 children who took the level 6 test were assigned standard scores in the 314 to 624 range. Thus, children were essentially assigned a continuous score that is expected to increase over time as the child progresses through school. Equivalence tables were set up to relate the raw score to a standard score according to the level of test administered and based on the results for children in the norm sample.

Children in the NLSCY sample were assigned a standard score using the equivalence tables. The advantage of using the standard score is that it will be possible to track a child's progress over time by comparing his or her standard score to the average standard score for the grade level.

There were some problems with the mathematics computation test in Cycle 1. The test used was not sufficiently difficult to properly distinguish math computation abilities among children in certain grades. The problem was critical for Grades 3 and 5, where many children achieved a perfect test score; this is often referred to as a "ceiling effect". This research papers in this publication did not use test data for children in Grades 3 and 5. A more difficult test has been developed for children in these grades for Cycle 2. A second problem relates to response rates. As discussed in Section 4 of the Technical Appendix, the response rate for the mathematics computation test was quite low; a score is available for only 48.2% of the responding NLSCY children in Grade 2 and above.

A more complete discussion of these problems can be found in the *User's Guide*, along with reliability and validity information regarding this test.

PMK (Person Most Knowledgeable)

One child aged 0 to 11 years was selected at random in each NLSCY household, and a question

was asked about who in the household was the person most knowledgeable (PMK) about this child. The intention was that the PMK — in most cases the mother — would provide information for all selected children in the household, as well as sociodemographic information about herself and her spouse. The latter information was used to describe the socioeconomic situation of the child's family. In rare cases it might have been appropriate to label two members of a household PMKs. In a step-family, for example, it may have been appropriate to label the mother as the PMK for one child and the father as the PMK for another. However, to simplify interview procedures, only one PMK was selected per household.

The following is a breakdown of the relationship between the PMKs and the NLSCY children:

- for 89.9% of children, the PMK was the mother (88.5% were the biological mother and 1.4% were the step-, adoptive or foster mother)
- for 9.5% of the children, the PMK was the father
- for 0.5% of children, the PMK was not a parent

For the majority of cases in which the PMK was not a parent, the child had a parent living in the household but the parent was not selected as PMK. This situation usually occurred when a child's mother was very young and living with her own parents (the child's grandparents), and the grandmother was selected as the PMK. Only 0.1% of NLSCY children did not live with a parent.

Peabody Picture Vocabulary Test - Revised

NLSCY children aged 4 to 5 years were given a vocabulary test: the Peabody Picture Vocabulary Test - Revised (PPVT-R) for English-speaking children or the Échelle de vocabulaire en images Peabody (EVIP) for French-speaking children.

The PPVT-R was designed to measure receptive or hearing vocabulary and can be used for any age group, up to adults. The test was developed by Lloyd and Leota Dunn at the University of Hawaii and has been widely used in both large-scale data collections and assessments. A French adaptation of the PPVT-R was developed by the test's authors and Claudia M. Thériault at St. Thomas University in Fredericton, New Brunswick. The French test is called the Échelle de vocabulaire en images Peabody (EVIP).

The PPVT-R/EVIP was used to measure the school readiness of NLSCY children aged 4 to 5 years. Verbal parental consent was required before the test was administered by the interviewer in the child's home. The child looked at pictures on an easel and identified which picture matched the word read aloud by the interviewer.

A total raw score was calculated for each child who completed the PPVT-R/EVIP by computing correct responses. A standard score was also assigned to each child to allow comparison of scores across age groups. A 5-year-old is clearly expected to perform better and obtain a higher score on the PPVT-R/EVIP than a 4-year-old. The standard score takes account of the child's age.

Standard scores of a test are usually based on the distribution of scores obtained by a defined sample of individuals; this is called the norm sample. Children in the PPVT-R/EVIP norm sample were assigned standard scores such that for all age groupings, the mean of the standard scores was 100 and the standard deviation was 15. This standardization was done by two-month age groups.

The PPVT-R/EVIP norm sample was based on a sample selected in the U.S. It was deemed appropriate to develop standard scores for the Canadian context. Therefore, in collaboration with the test's developers, Canadian norms were developed for children aged 4 to 5 years. It should be noted that the standardization was done separately for the PPVT-R and for the EVIP. Therefore, when global comparisons are made between children who completed the test in English and those who completed it in French, performance should, by definition, be equivalent.

Information regarding the reliability and validity of the PPVT-R/EVIP can be found in the *User's Guide*.

Protective factors

Factors that contribute to resilience in children (i.e., the ability to cope with or "bounce back" from stressful life situations). Protective factors provide a buffer, as well as a reservoir of resources, to deal effectively with stress; they therefore result in positive developmental outcomes (such as school completion). Protective factors can be classified into three main types: characteristics of the individual (e.g., sense of self-esteem); supportive relationships

within the family (e.g., quality parenting); and supportive environments or relationships outside the family (e.g., positive school experiences).

Representative sample

A sample that accurately reflects the important characteristics of the population from which it was drawn. This allows valid generalizations of results from the sample to the whole population. Due to the methodological procedures used to select the survey sample, the characteristics of the NLSCY sample are representative of the population of children in Canada.

Risk factors

Factors that increase the likelihood of poor developmental outcomes for children. Risk factors are variables that are linked to the later development of pathology or maladjustment. They can be classified into three categories: those that arise from the individual (e.g., stressful life experiences); those that arise from the individual's family (e.g., exposure to or victim of violence); and those that arise from the individual's environment (e.g., poverty).

Scale data

Some of the concepts investigated in the NLSCY could be most appropriately measured through a "scale." A scale is a group of questions or items that measure a certain concept when the answers to the questions or items are combined. For example, it was deemed important to measure 10- and 11-year-old children's perception of their relationship with their parents. The scale used⁸ is intended to measure three different factors or constructs related to parenting: nurturing; rejection; and monitoring.

The *User's Guide* contains a complete description of the analyses conducted for each scale. The *User's Guide* gives items included in all factors found to exist in each scale, information on how the scores were calculated for each factor, and reliability and validity measures. The *User's Guide* indicates whether a factor structure found to exist

⁸ This scale was developed by J. D. Lempers et al (Lempers, J. D., et al. 1989. "Economic hardship, parenting, and distress in adolescence." *Child Development*, 60: 25-39), based on the work of E. S. Schaefer (Schaefer, E. S. 1965. "Children's reports of parental behavior: an inventory." *Child Development*, 36: 413-424) and on the work of G. C. Roberts et al (Roberts, G. C., et al. 1984. "Continuity and change in parents' child-rearing practices." *Child Development*, 55: 586-697).

in the NLSCY data differs from structures previously reported in the literature. Unless otherwise stated, scale scores reported in any of the research papers in this publication refer to scores derived at Statistics Canada (as discussed in the *User's Guide*).

Socioeconomic status (SES)

Socioeconomic status (SES) is often operationally defined through measures describing occupational prestige, education levels and economic positions.

In Cycle 1, a measure of SES was derived for each family in the sample and the result was assigned to each selected child in the family. The SES measure was derived from five sources: the PMK's level of education; the level of education of the PMK's spouse; the prestige of the PMK's occupation; the prestige of the PMK's spouse's occupation; and the household income. The final SES variable was standardized so that it had a mean of 0 and a standard deviation of 1.

More details on how SES was derived can be found in the *User's Guide*.

Spouse

If the PMK had a partner residing in the household at the time of the interview, that person was labelled the spouse. Spouses included both married and common-law partners. Detailed socioeconomic in-

formation was collected about the spouse in order to describe the child's family situation.

The following is the breakdown of the relationship of the spouse to the NLSCY children:

- for 15.7% of children, the PMK did not have a spouse residing in the household
- for 75.6% of children, the spouse was the father (71.1% the biological father and 4.9% the step, adoptive or foster father)
- for 8.4% of children, the spouse was the mother
- for the remaining 0.3% of children, the spouse was not a parent

Statistical significance

Results obtained by analysing the sample and which are statistically significant can be generalized to the larger population because it is unlikely that the observed relationships occurred by chance alone. If statistical significance is found, one cannot assume that there is no relationship between the variables in the larger population.

Weighted data

Data whose values have been adjusted to reflect differences in the number of population units each case represents (see Table 1 in the Technical Appendix).

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